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A JOURNAL DEVOTED TO THE INTERESTS, PRACTICE, AND PROGRESS OF AERIAL LOCOMOTION AND TRANSPORT.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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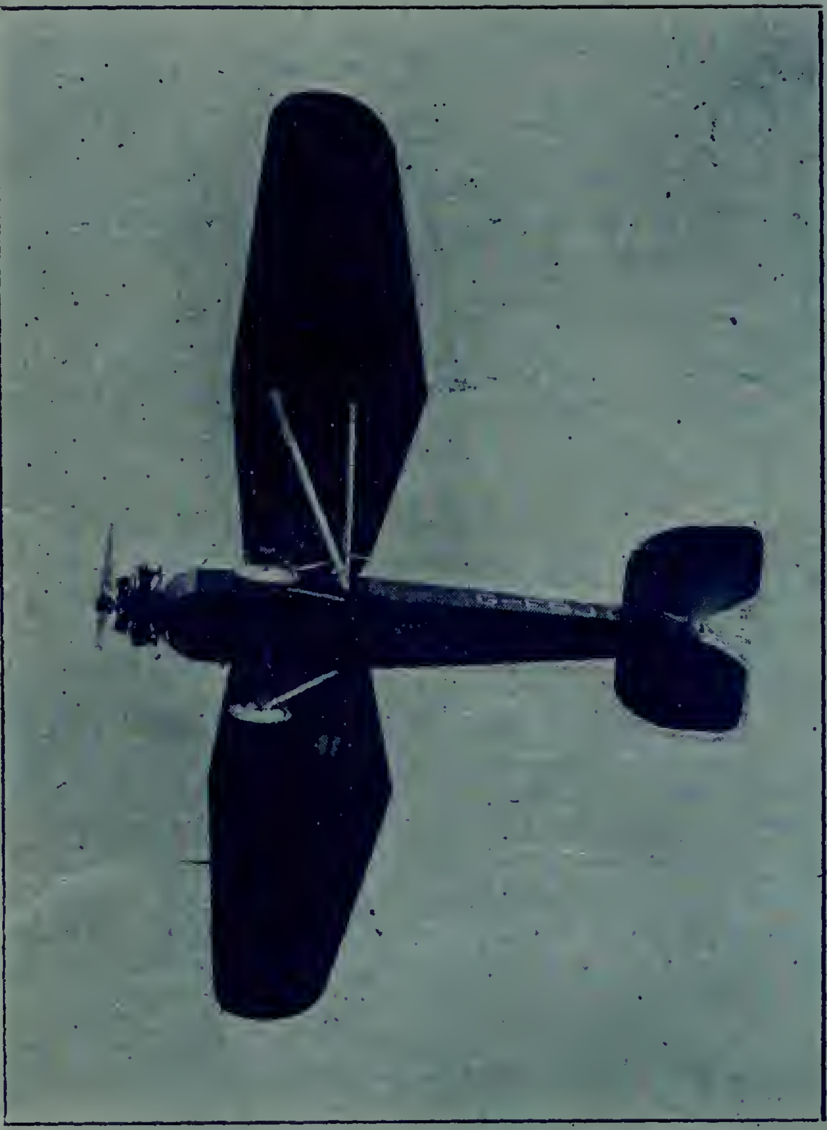

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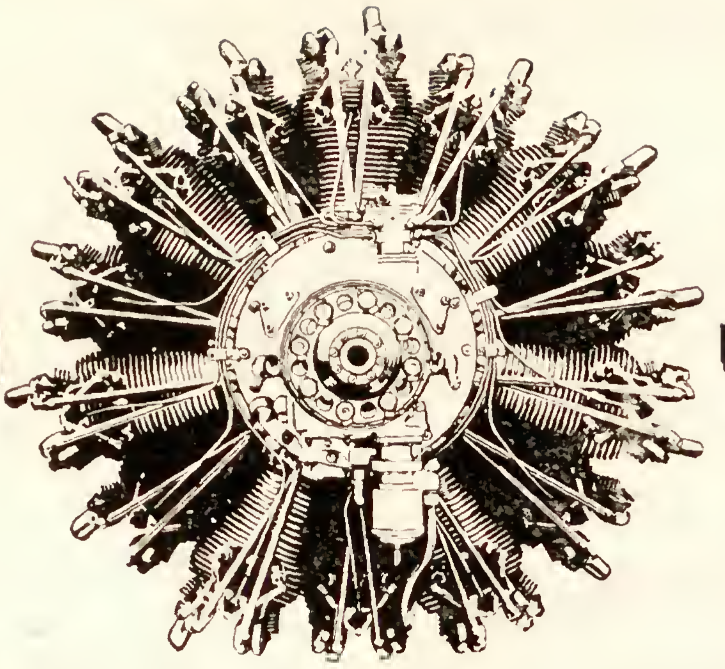

ENGLAND—AUSTRALIA—ENGLAND
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The

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on his De Havilland 50 aeroplane
has now completed

44,000
Miles of
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The same Jaguar Engine was used in Sir Alan Cobham's flight London to Cape Town and back.

The Times
Leader Writer says:

"It is now just three months since Sir Alan Cobham, with his former mechanic, Mr. A. G. Elliott, set out on the long return journey between this country and Southern Australia. In that time he has covered, in the height of summer and largely in the torrid zone, a distance greater than the girdle of the earth, longer by 12,000 miles than his 16,000-mile flight earlier in the year to and from the Cape. To have accomplished two such journeys with so short an interval between them—in each case for the first time on record and using throughout the same aeroplane and engine—is a notable triumph for the man and for his machine. British flying skill and air sense, and British workmanship, have alike proved equal to every difficulty and danger which had to be faced."

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FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

N# 11

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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Flight

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To those desirous of obtaining copies of "Flight" Photographs, these can be supplied, enlarged or otherwise, upon application to Photo. Department, 36, Great Queen Street, W.C.2

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926
Oct. 7 .... Col. the Master of Sempill, A.F.C. "Aero Engine Fuels of Today and Tomorrow," before R.Ae.S.
Oct. 8 .... Inst. of Aeronautical Engineers' Dinner to A. J. Cobham at Kettner's Restaurant.
Oct. 14 .... Aero Golfing Society's Autumn Meeting, Wentworth Park, Virginia Water.
Oct. 17 .... Lecture, "Scientific Problems of Commercial Aviation," by Air Vice-Marshall Sir W. S. Brancker, at the Guildhouse, Eccleston Square, S.W. 1.

EDITORIAL COMMENT.

England–Australia–England

"I KNEW little about seaplanes before we started, but I have learnt a a lot since." This sentence, quoted from the message to FLIGHT readers from [Sir Alan J. Cobham which we publish elsewhere in this issue, is significant in several ways, especially when it is borne in mind that whatever his ideas on seaplanes when he started, Cobham has undoubtedly returned a firm believer in the suitability of the seaplane type of machine for certain services in Empire air communications. In this connection we may quote another sentence of his from the message on p. 649: "*During the months in which we chose to do the job, July, August and September, it would have been impossible, as we encountered the weather, to have accomplished the flight on an aeroplane, and it was only by being able to alight at any moment on the various waterways we passed over that we were able to get through the various monsoon storms which we encountered.*" The admission by Sir Alan that at the outset he did not know a great deal about seaplanes, coupled with the undeniable fact that he succeeded in accomplishing his flight, may surely be taken as proof that, in the case of a small twin-float seaplane like the D.H. 50 J at any rate, a pilot need not, as some would have us believe, be a sailor with centuries of salt and tarry traditions behind him, and possessing occult powers vouchsafed only to a chosen few, in order to be able to handle his machine. When it comes to large seagoing flying boats, doubtless it may be another matter, but at any rate Sir Alan appears to have demonstrated that a land 'plane pilot does not require extensive training before he can be entrusted with a seaplane of the smaller type.

The fact that Sir Alan expresses his belief in the seaplane for certain Empire air routes should be made the most of by those who, like we on FLIGHT, have for years held the view that the seaplane was the logical type to develop for Empire communications, and as he is a self-confessed novice he cannot at any rate be accused of being prejudiced in favour of the seaplane, as might have been a seaplane pilot of long standing. This is all the more reason why his opinion should be listened to with respect, and the magnificent flight can, on the whole, be said to have been the absolute vindication of the seaplane.

Concerning the flight to Australia and back, and the wonderful reception given to Mr. Cobham on his return, both are dealt with fairly extensively in the special pages of this week's issue of FLIGHT. The reception was well deserved, and the number of people who crowded to London's river to see the home coming provided the most convincing proof that the flight had aroused the interest of the man in the street. In view of the fact that the flight was not one of the spectacular sort in which long distances are covered in very short time, this interest on the part of the public is significant, and leads one to believe that the hope expressed by Sir Alan Cobham—that the flight be regarded not as a " stunt " but as a serious attempt to discover at first hand the capabilities of aircraft to battle against severe weather conditions—is in a fair way to be realised.

We are aware that reference has been made to Sir Alan's achievement on this latest flight, by pointing out that others have flown over the same route in shorter time, or have covered greater total mileages, and so forth. Now the truth of the matter is that every kind of flight has its own particular utility. The spectacular dash, in which distances of several thousand miles are covered without landing, has its value. It is impressive; it demonstrates—apart from the endurance of the pilot—the ability of the engine to continue to run for long periods without a stop. It opens the eyes of the world to the manner in which aircraft can bring close together points situated far apart geographically. Undoubtedly, such flights are of the very greatest value, and every credit is due to those who have made them.

The long flight just concluded is of a very different nature. Although a number of very long stages were covered at high average speed, these were not the main object of the flight, nor the most useful part of it, highly creditable as they were in their own way. What the flight has really proved is that British aircraft material will stand the rough usage which a flight made in short stages and with numerous alightings in all sorts of conditions, from the most favourable to the worst imaginable, brings with it. By planning the flight to take place during a different period, much, if not all, of the bad weather might have been avoided, and the flight to Australia and back might have been made in very much shorter time. But it is quite certain that such a flight, although infinitely more spectacular, would not have had the technical results and the valuable experience which the flight, as carried out, has produced.

The de Havilland 50 biplane is the same as that on which Sir Alan Cobham flew, with Air Vice-Marshal Sir Sefton Brancker to Burma and back. It is the same as that used for his flight to the Cape and back, and now it has been to Australia and back, adding another 28,000 miles or so to its useful work. In view of the fact that the machine is of perfectly normal construction, with spruce and plywood as its main structural materials, such enormous mileages, piled up in temperatures varying from one extreme to the other, in climates ranging from bone dry to torrential rains, are convincing proof that when the time comes to operate organised air routes in distant parts of the Empire, we need have no undue anxiety on the subject of wood construction, nor of fabric covering protected by British dope.

For the Armstrong-Siddeley " Jaguar " engine, one can have nothing but the very greatest admiration. First, it took Sir Alan to the Cape and back, running without trouble of any sort through sandstorms, rain, mist and tropical heat. Now the same engine—the identical engine and not merely one of the same type—has done another 28,000 miles, and still seems to be in excellent running order, in spite of the fact that since leaving England on June 30 last, it has had no major overhaul. Truly, a performance of which not only the makers, but the whole British nation may well be proud, and which has proved to the hilt that Empire air routes are perfectly feasible with existing material, their organisation being now merely a question of finance.

It is impossible to refer to every detail which has contributed to the success of the flight to Australia and back. Such details would run into columns. But the very fact that Sir Alan Cobham is so emphatic in stating that the flight would not have been possible on a landplane, inevitably draws attention to the marine part of it: the Duralumin floats designed and built by Short Brothers, of Rochester. It must be appreciated that during a flight of this nature, alightings have to be made under all sorts of conditions, mostly unfavourable. Yet as far as can be gathered, the floats never gave any trouble whatsoever, and are today as perfectly watertight as they were when they left the water of the Medway on June 30. Corrosion troubles were for a long time the bugbear of Duralumin construction, but there can, we think, be no doubt any longer that with suitable protective covering in the form of paint, &c., Vickers' Duralumin can be relied upon for hard service, even under very bad conditions.

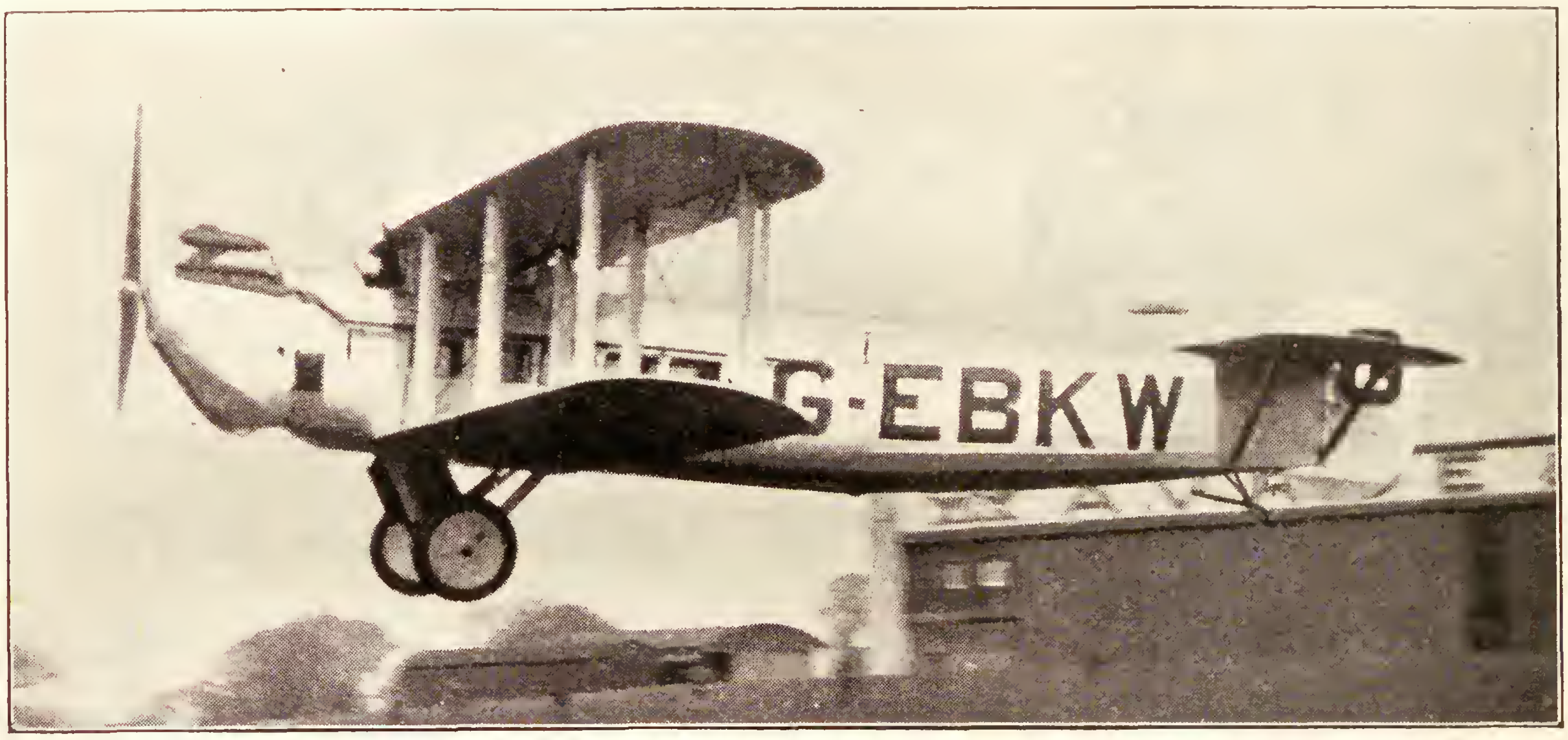
Altogether, the British Empire has good cause to be grateful to those responsible for the organisation, financing and carrying out of the England-Australia-England flight, and particularly, of course, to Sir Alan Cobham, K.B.E.

* * *

The 3-engined Age

There can be no doubt about it. The three-engined age is upon us. Already the Handley-Page and Armstrong-Whitworth three-engined machines are in use by Imperial Airways. The new de Havilland 66 has just been completed, and is about to be thoroughly tested. In the Blackburn " Iris," illustrated this week, the three-engined arrangement has been adapted to the flying-boat type. And, finally, we publish photographs of two new German three-engined commercial aeroplanes, the Junkers 1,000 h.p. G.31 and the Rohrbach " Roland." Further, it is rumoured that Beardmore's are producing a large three-engined monoplane, the " Invincible," and it is known that a small 'plane with three engines, is in course of construction at Cricklewood, the Handley-Page " Hamlet." Thus we see the three-engined type becoming quite virulent. With its arrival, aviation enters a new phase, and it will be interesting to see, during the next few years, whether the freedom from forced landings expected from the three-engined machine will result in more regular operation of aircraft, and especially in a more intensive development of flying in fog and during the night. For long-distance air routes, night flying will be essential. Will the three-engined machine render night flying a practical proposition? We shall see.

AVRO



THE single engined commercial aeroplane, illustrated above, can be arranged to carry twelve passengers with baggage and an attendant, in addition to a crew of two.

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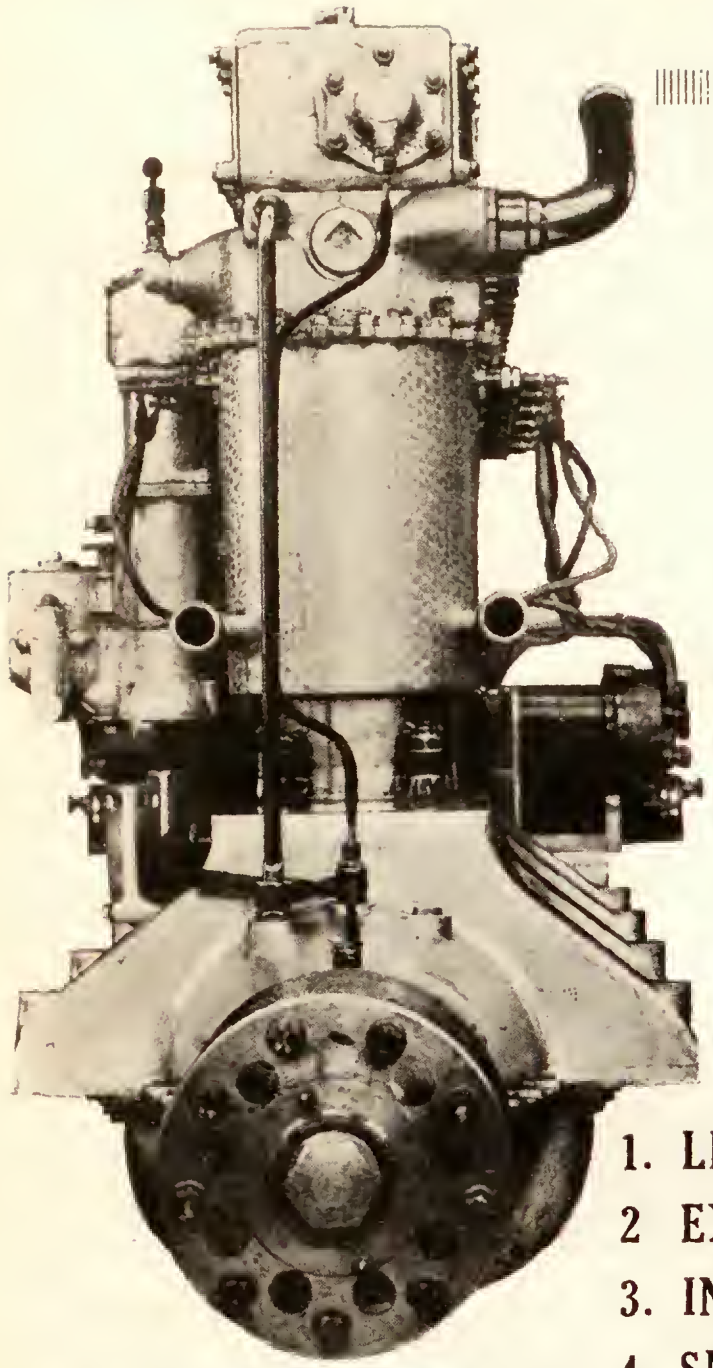

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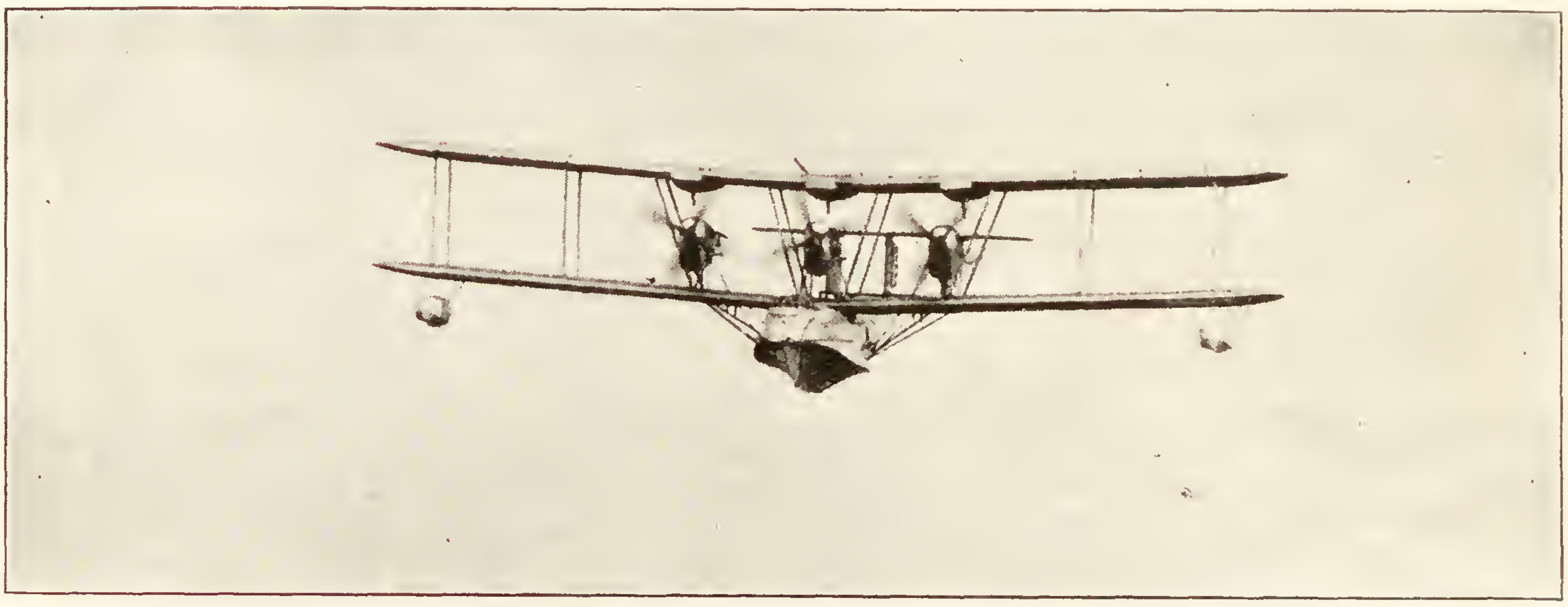
NEW BRITISH THREE-ENGINED FLYING BOAT

First Public Demonstration of Blackburn " Iris "

On Wednesday of last week, September 26, the inhabitants of and visitors to Cromer were treated to a sight, the significance of which may easily have escaped the great majority, although certainly the party which travelled up to Cromer specially for it were in no uncertainty as to the importance of the occasion. On that day the first of the new Blackburn " Iris " flying boats, fitted with three Rolls-Royce " Condor " engines, made its first public demonstration flight, and the party to which reference has been made were the guests of the Blackburn and Rolls-Royce companies, having travelled up to Cromer on the day preceding the flight. The original intention had been that the Secretary of State for Air, Sir Samuel Hoare, Bart., should board the flying boat at Cromer and make a flight around the district. On Wednesday, however, a comparatively rough sea was running off Cromer, and when the " Iris " arrived from Felixstowe, piloted by Flight-Lieutenant H. G. Sawyer, it was decided that, although the " Iris " would probably have no difficulty in alighting and taking off again, to establish contact with it by means of a boat from the shore would be an operation accompanied by some considerable difficulty, and as the machine is a new one and about to undergo some highly important tests, it was thought prudent not to run any risk. Consequently Sir Samuel Hoare was unable to carry out his plan of going for a

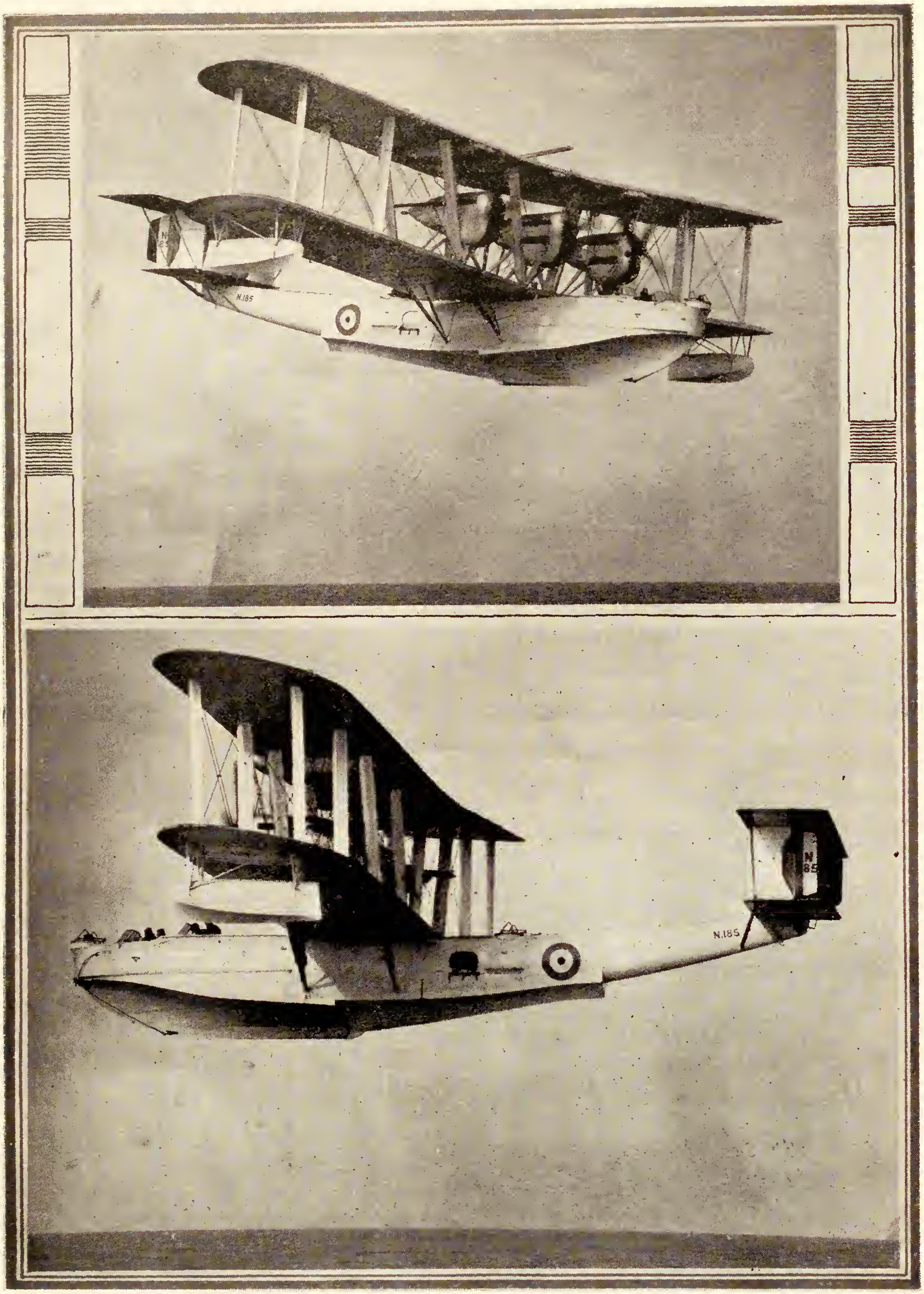


[" Flight " *Photograph*

THE BLACKBURN " IRIS ": For a three-engined flying boat of large size the frontal area is remarkably small, as this front view illustrates.

[" Flight " *Photograph*

AIR MINISTER WITNESSES DEMONSTRATION OF HUGE FLYING BOAT: This group, photographed at Cromer last week, includes, from left to right: Capt. Burgess (Rolls-Royce), Mr. Rhodes (Blackburn), Mr. Pooley (Rolls-Royce), Sir Samuel Hoare, Bart., Secretary of State for Air, and Mr. Robert Blackburn, founder and managing director of the company bearing his name, and by whom the " Iris " was designed and built.



["FLIGHT" *Photographs*

MORE THAN 2,000 H.P. : Two views of the Blackburn "Iris" with three Rolls-Royce "Condor" engines. This machine is of recent construction and may not, therefore, be described. Doubtless, however, keen observers will be able to appreciate from these photographs many of its special features. No dimensions may be given, but the size of the figures of members of the crew help to lend "scale" to the machine.

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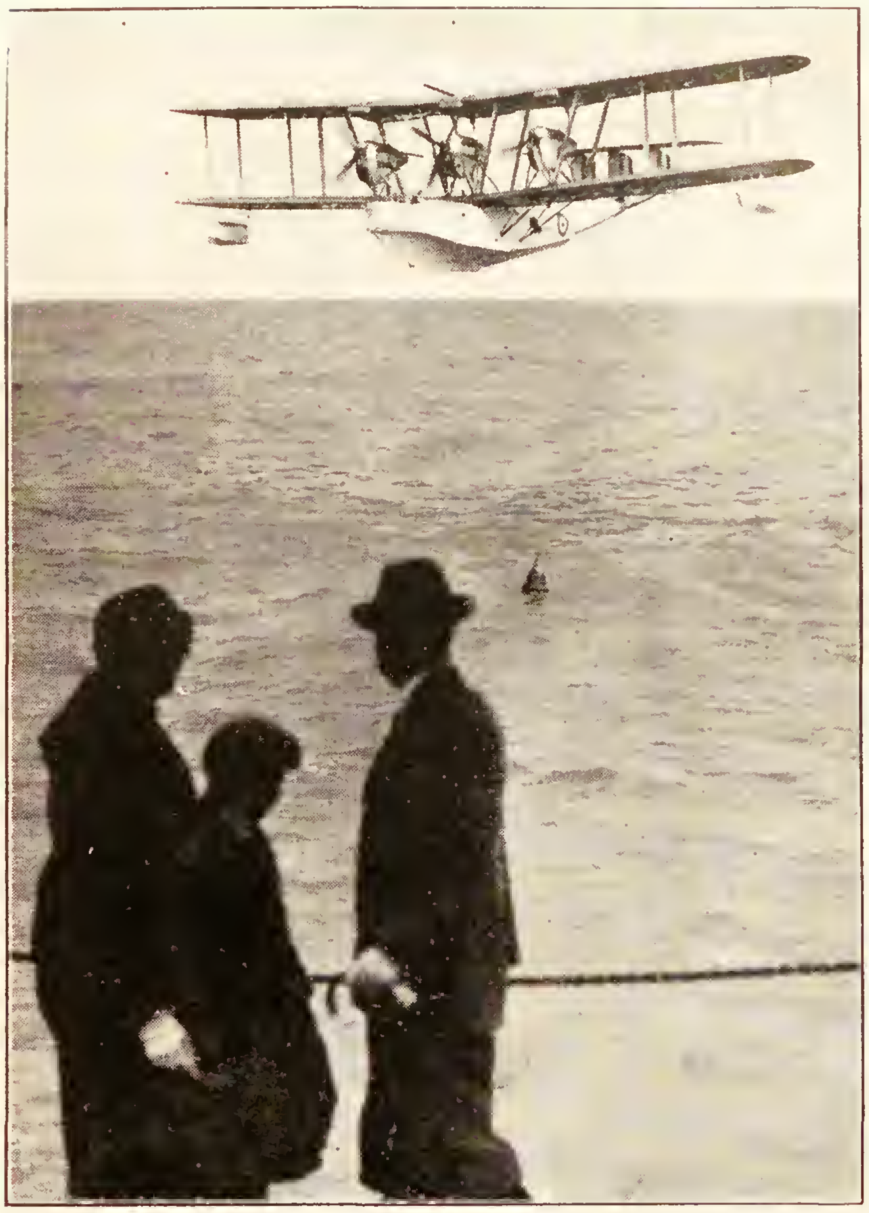
flight, but it is hoped that it may be possible to arrange for the flight to take place at a later date.

Although unable to experience an actual flight in the machine, the Secretary of State for Air watched with the keenest interest the evolutions through which Lieut. Sawyer put the "Iris." The machine was flown past at full speed, with its 2,000 odd horse-power roaring at full throttle, and it was flown past slowly, demonstrating the great speed range of which the machine is capable.

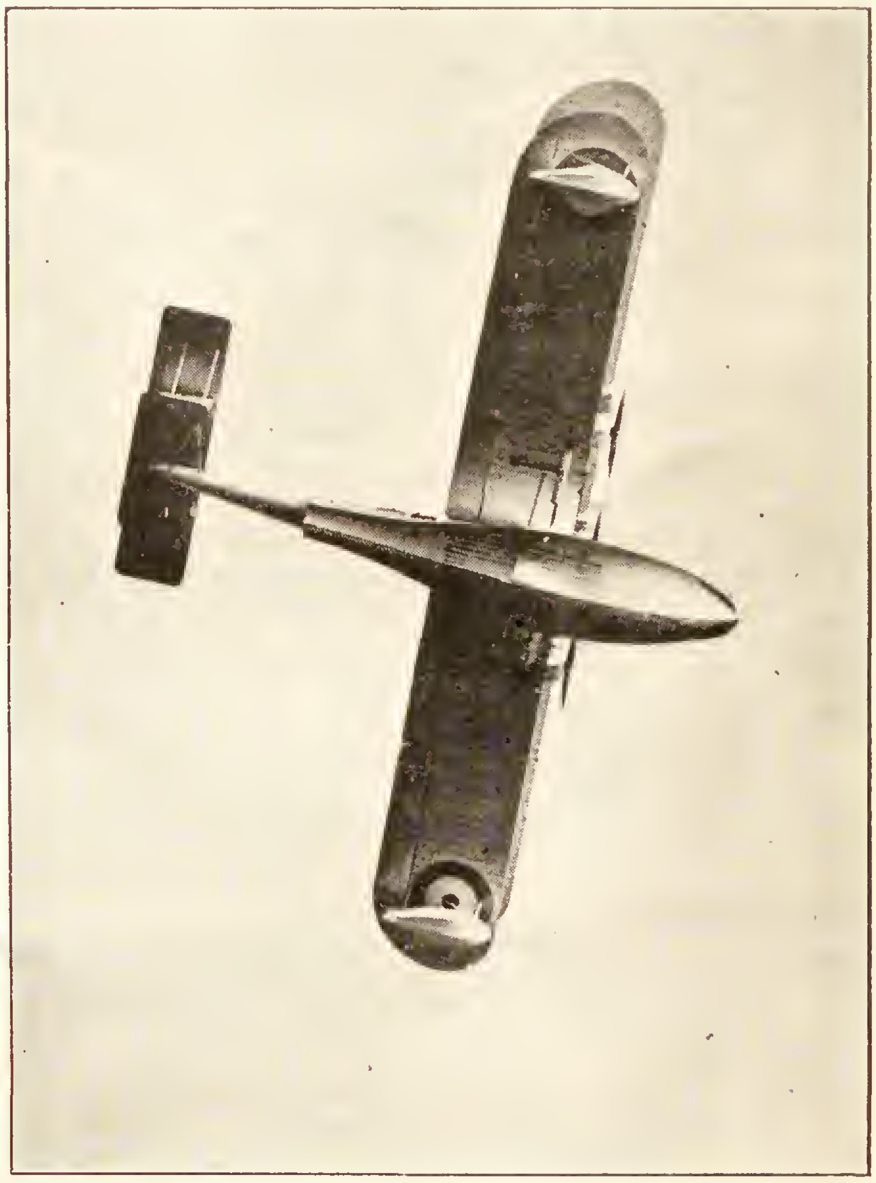
From a technical point of view the demonstrations given by Lieut. Sawyer of the ability of the Blackburn "Iris" to fly with any one of her three engines stopped was, perhaps, the most interesting part of the flight. Not only did the machine fly strongly with any one of the engines stopped, but it even climbed at what appeared to be quite a good rate. Furthermore, with the port outboard engine stopped, the machine was able to make a turn to starboard without any apparent difficulty, the turn, of course, being made *against* the natural tendency of the machine to turn to port. Thus there can be no doubt that even with one engine out of commission the "Iris" is not only capable of flying straight and of climbing, but is perfectly able to manœuvre in any way likely to be required. Doubtless this is due to the spacing of the three engines close together.

Finally, Lieut. Sawyer gave a demonstration of the enormous power reserve of the machine by flying for considerable periods with the two outboard engines stopped, only the central engine being working. Although presumably the machine must have been losing height all the time, the loss was certainly very small, and the distance which the machine would be able to travel in case of damage to the two outer engines, provided a reasonable altitude had been reached before the stoppage, would run into many miles. Thus the risk of a forced descent owing to engine failure should be very remote.



["Flight" *Photograph*

The Fly-past: The Secretary of State for Air, Sir Samuel Hoare, Bart., with whom is Lady Maud Hoare and their son, watching the Blackburn "Iris" flying off Cromer last week.



["Flight" *Photograph*

Not a Vertical Bank: This photograph shows the Blackburn "Iris" from below as the machine is passing overhead, and gives an excellent idea of the shape of the planing bottom, steps, etc.

Concerning the "Iris" nothing may be said in the way of statements of weight or dimensions, nor may any performance data be given. That the machine marks a very decided step ahead there can, however, be no doubt whatever, and it is gratifying to know that, however stepmotherly we may have treated the seaplane in the past, there are signs that in official quarters a determination exists to make Great Britain supreme in the matter of large seagoing flying boats. In her present form the Blackburn "Iris" is intended for long-distance reconnaissance and for coastal defence and submarine patrol. There is, however, no reason to doubt that with suitable modifications the machine would be a most useful type for civil flying on Empire routes. The Blackburn Aeroplane and Motor Company, one of the pioneers of British aviation, its founder and managing director, Mr. Robert Blackburn, having been amongst the first in this country to design and construct aeroplanes, is to be congratulated upon a very fine production, as is also the Rolls-Royce firm on having developed engines of sufficient power to make such a machine possible.

* * * *

Cairo-Aden-Cairo Flight Ends

The two R.A.F. Vickers "Victoria" machines, under Air Commodore C. R. Samson, which flew from Cairo to Aden, started on the return journey last week, and arrived back in Cairo on October 29. They started from Cairo on September 15.

Irish Flying Officers Killed

Lieut. Prendervill and Cadet O'Reilly, of the Irish Free State Air Force, were killed on September 21 whilst carrying out a flight in a Bristol fighter during army manœuvres at Hempstown Common, near Dublin.

Personals

Married

Robert Stewart Blucke, R.A.F., only son of the Rev. R. S. K. Blucke, M.A., H.C.F., and Mrs. Blucke, of Monxton Rectory, Andover, was married on September 22, at Sanderstead Parish Church, to Nancy, daughter of Frank Wilson, Esq., and granddaughter of the late James Wilson, Esq., of Sanderstead.

The marriage took place at Holy Trinity Church, Fareham, Hants, on September 23, between Flight-Lieut. Herbert Carmichael Irwin, A.F.C., R.A.F., second son of Mr. Thomas Francis Nesbitt Irwin, Donnybrook, Dublin, and Mrs. Irwin, Fron Deg, Rhos Neigr, Anglesey, and Miss Olivia Marjory Macdonald Teacher, daughter of Dr. and Mrs. Charles C. Teacher, of Hollington, Fareham, and formerly of Craigend, North Berwick. Flight-Lieut. Drew acted as best man. Among the large number of presents received by the bride and bridegroom were gifts from the Officers' Mess, School of Balloon Training, the Officers' Mess staff, School of Balloon Training, some of the staff at Royal Airship Works, etc.

On September 22, at All Saints', Compton, Winchester, Flight-Lieut. H. S. Scroggs, R.A.F., only son of Comdr. H. C. Scroggs, R.N. (retired), and Mrs. Scroggs, of Colden Common, Winchester, was married to Margaret Fray, only daughter of Mr. and Mrs. E. E. Powell, of Shawford, Winchester, late of Ceylon.

On October 2, at St. Luke's, Redcliffe Square, Montagu Douglas Ommanney, R.A.F., second son of D. G. Ommanney, Esq., D.I.G., Indian Police, Karachi, was married to Phyllis, daughter of the late Mr. and Mrs. S. Williams.

At Benwell Parish Church, on September 30, Norman Storey (Newcastle Aero Club and late R.A.F.), second son of Mr. and Mrs. Thos. Todd, of Newcastle, was married to Jemima, youngest daughter of the late Mr. and Mrs. Thos. Little, of Newcastle.

Flight-Lieut. Roy A. Vosper, R.A.F., was married quietly in London in August to Kathleen Iris Liddlelow, youngest daughter of Mr. and Mrs. Liddlelow, of Errol Par, Trinidad, B.W.I.

To be Married

The marriage arranged between Mr. Gerald Armstrong, R.A.F., and Miss Alexia Barre Phipps will take place at Christ Church, Esher, on October 9, at 2.15.

◆ ◆ ◆ ◆

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The London Aeroplane Club broke all its previous records for flying time during the month of September. There were three blank days owing to bad weather, and the total flying time during the month was 206 hrs. 15 mins., giving an average of over 7½ hrs. per day. During the week ending October 3, 1926, the total flying time was 60 hrs. 10 mins.

The following members were given dual instruction: Miss O'Brien, H. R. Presland, S. H. S. Garne, J. Barros, E. A. Lingard, O. H. Best, W. L. S. McLeod, M. P. Susman, E. K. Blyth, B. B. Tucker, L. G. Sykes, H. F. Wright, G. Lyon, P. O. A. Davison, J. S. M. Michie, A. J. Richardson, R. A. St. John, L. G. Grammond, G. N. Howe, G. Vlasto, F. C. Elford, T. H. O. Richardson, H. Solomon, V. H. Doree, Lady Bailey, R. L. Portway, R. Malcolm.

The following members flew solo: J. Barros, Miss O'Brien, R. Malcolm, O. J. Tapper, W. Hay, Capt. Roche-Kelly, N. Jones, Maj. K. M. Beaumont, B. B. Tucker, E. K. Blyth, Lady Bailey, H. Petre, A. H. M. Lees, R. L. Portway.

The following members had joy rides: S. S. Hope, S. O. Bradshaw, Miss Hay.

At the Manchester Pageant organised by the Lancashire Aero Club, which was held at Woodford Aerodrome on Sunday last, the Club was represented by Maj. K. M. Beaumont, G. H. Craig, W. Hay and Capt. F. G. M. Sparks. Only one club machine, G-EBMF, was sent, and this was flown from Stag Lane to Woodford by Maj. K. M. Beaumont and G. H. Craig. Capt. F. G. M. Sparks and W. Hay also made the journey by air on G-EBKT, Mrs. Eliott-Lynn's "Moth."

Mrs. Eliott-Lynn is now giving flying instruction, and the first of her pupils to pass the tests for an Aviator's Certificate is Lieut. George Harold Neville Larden, R.A. The tests were successfully carried out at Stag Lane Aerodrome on Tuesday, September 28, 1926.

Hampshire Aeroplane Club

Report for week ending September 30: Total flying time, 14 hrs. 36 mins.; instruction flying, 11 hrs.; passenger flying, 1 hr. 46 mins.; solo flying, 1 hr. 50 mins.

The following members received instruction: Miss Home, 2 hrs. 35 mins.; Messrs. Perfect, 70 mins.; Dobson, 45 mins.; Shepherd, 55 mins.; Rumble, 40 mins.; Bishop, 35 mins.; Stokes, 35 mins.; Maloney, 30 mins.; Southcliffe, 25 mins.; Rodger, 25 mins.; Everett, 25 mins.; Courtney, 20 mins.; Dunning, 20 mins.; Chadwick, 20 mins.; Westbrook, 18 mins.; Fry, 15 mins.; Nicholson, 15 mins.; Bound, 5 mins.

The following members received passenger flights: Mrs. Dick, Master Waite, Mr. Laver, Mr. Hales, M. Key, Mrs. Fry, Lady Snagg.

The following members flew solo: Mr. O. E. Simmonds, 45 mins.; F/O Clarkson, 12 mins.; Mr. K. R. L. Bowen, 20 mins.; Mr. Fry, 20 mins.

Lancashire Aero Club

Report for week ending October 1: Total time for the week, 29 hrs. 40 mins., made up as follows: Dual with Mr. Stack—Birley, 3 hrs. 50 mins.; Fallon, 1 hr. 10 mins.; Gatterell, 55 mins.; Hope, 55 mins.; Shires, 30 mins.; Gerrard, 45 mins.; Nelson, 30 mins.; Costa, 30 mins.; Abdulla, 25 mins.; Smith, 25 mins.; Anderson, 25 mins.; Benson, 10 mins.; Honeyball, 10 mins.

Dual with Mr. Cantrill—Miss Brown, 50 mins.; Wood, 30 mins.

Solo—Costa, 1 hr. 30 mins.; Leete, 1 hr. 25 mins.; Goodfellow, 35 mins.; Agar, 30 mins.; Lacayo, 25 mins.; C. Agar, 25 mins.; Leeming, 20 mins.; Cantrill, 10 mins.; Williams, 10 mins.; Fallon, 10 mins.

Joy rides with Messrs. Stack, Scholes, Goodfellow, Leeming, and Leete: Warrington 35 mins.; Miss Holman, 30 mins.; White, 30 mins.; Smith, 30 mins.; Leeming, 20 mins.; Pitman, 15 mins.

Flying during the display, 5 hrs. 5 mins. Tests, 2 hrs.

Three more soloists have made their debuts, Messrs. Costa and Benson going solo just before the display and Mr. Fallon just after it. With any reasonable luck the club may now count on achieving its twentieth "A" licence before the Philistines (in the shape of November fogs) be upon us. While admitting in the most frank and open manner that Mr. T. N. Stack is nobody's "inveterate rival," one may yet be permitted to offer him a gentle pat on the thoracic vertebræ in respect of his well-intentioned efforts in the way of turning out pilots.

Congratulations also to Mr. Mark Lacayo, one of the club's first pupils, who followed up his success in the inter-club members' race at Woodford by capturing the Gladstone trophy at the Yorkshire meeting last Saturday.

Will members please note that the club will not be closed on the 6th, 7th and 8th as announced last week, but will re-open at 10 a.m. on Wednesday, the 6th inst., for flying as usual.

The Midland Aero Club

Report for week ending October 2:—The total flying time for the week was 10 hrs. 38 mins. The following members were given flying instructions: E. R. King, J. Brinton, H. Beamish.

The following "A" pilots made solo flights: H. Willis, W. Swann, R. L. Jackson, C. L. Knox, E. J. Brighton.

During the week E. R. King and J. Brinton made their first solo flights, which in each case was satisfactorily carried out.

Mr. Willis had a forced landing on the Austin "Whippet" on Sunday, but despite the small size of the field in which he landed, no damage whatever resulted.

The Newcastle-upon-Tyne Aero Club

Report for week ending September 26:—Dual instruction, 5–30 hrs.; solo, 13–05 hrs. Total, 18–35 hrs.

The following members flew under instruction with Mr. Parkinson: Miss C. R. Leathart, Mrs. Marcks, Messrs. Irving, E. C. Kennedy, Somerville, Matthews, Shaw, Middleton, J. M. Kennedy, Turnbull, H. Ellis.

Solo: Mr. Phillips with Mr. Whitfield and Mr. A. Bell as passengers. Mr. Forsyth Heppell with Mr. Herdman as passenger. Mr. N. S. Todd with Mr. W. Todd and Mr. R. N. Thompson. Dr. H. L. B. Dixon with Mr. Charlton and the Rev. Mr. Allen. Mr. R. N. Thomspon with Mr. Whitfield, Mr. Carr, Mr. N. S. Todd, Mr. H. Ellis.

LX left for Woodford on Saturday, so that on account of this and the absence of Mr. Parkinson only a small amount of flying took place at the aerodrome.

Report for week ending October 3rd:—Dual instruction, nil; solo, 7 hrs. 15 mins. Both "Moths" were at Sherburn from Saturday until Sunday afternoon. LY was returned to service on the 1st, and took part in the Yorkshire Club's meeting.

The following members flew:—Mr. Phillips with Messrs. H. Ellis and Carr. Mr. R. N. Thompson with Messrs. Whitfield and Ellis. Mr. N. S. Todd with Miss B. Thompson and Miss N. Turnbull. Mr. Forsyth Heppell and Dr. H. L. B. Dixon flew alone.

The club is very well pleased with the performance of its team in the relay race at Woodford. The tankards did come to Newcastle after all! The team was as follows, not as given in the programme and previous reports:—Mr. Forsyth Heppell, Mr. F. H. Phillips, Mr. N. S. Todd, and Dr. H. L. B. Dixon. Mr. N. S. Todd was placed second in the landing competition. Mr. Baxter Ellis was absent on holiday.

Dr. Dixon has collected another *ab initio* trophy, that from the Yorkshire Club's meeting, and all are pleased that Mr. R. N. Thompson obtained third place.

Mr. Phillips was second in the competition for the Captain Gladstone trophy, and Mr. Parkinson second in the bomb dropping competition.

Now that the club has completed one year's operations and that the flying meetings are over for the year, the club looks back with satisfaction upon the progress made.

The total amount of flying carried out is 1,160 hrs. Twelve members have obtained licences and a further eight are in the final stages of training, and 17 have had a considerable amount of dual instruction and with a continuity of practice will soon pass out on the two original "Moths."

The following are the successes gained in the four meetings attended, including the Newcastle meeting:—

Yorkshire Aero Club's Meeting (August)

Instructors' race.—Mr. J. D. Parkinson, trophy presented by Mrs. R. W. Kenworthy, and £20.

Open handicap.—Mr. J. D. Parkinson, second prize, £10.

Newcastle Meeting

Instructors' race.—Mr. J. D. Parkinson, President's Cup and prize (first).

Inter-Club Members' race.—Dr. H. L. B. Dixon, trophy presented by Mrs. De Lancey Willson.

Lancashire Club Meeting (September)

Team race.—Team of four members, four silver tankards, presented by Sawley Brown, Esq.

Landing competition, Mr. N. S. Todd.—Silver cigarette box. Second prize, presented by Mr. John Lord.

Yorkshire Meeting (October)

Inter-Club Members' race.—Dr. H. L. B. Dixon (first). Silver cup, Mr. R. N. Thompson (third).

Landing competition.—Mr. F. Howard Phillips (second).

Bombing—Mr. J. D. Parkinson (second).

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A flight of Royal Air Force Vickers-Victoria machines fitted with Napier engines are now undertaking a flight from Cairo to Aden and back.

Major Franco, on a Dornier Wal flying boat fitted with two Napier engines, flew from Spain to Buenos Aires, covering 12,518 engine flying miles.

The First Prize in the German competition to discover the best commercial seaplane was won by the only Napier-engined machine entered —the HEINKEL NAPIER.

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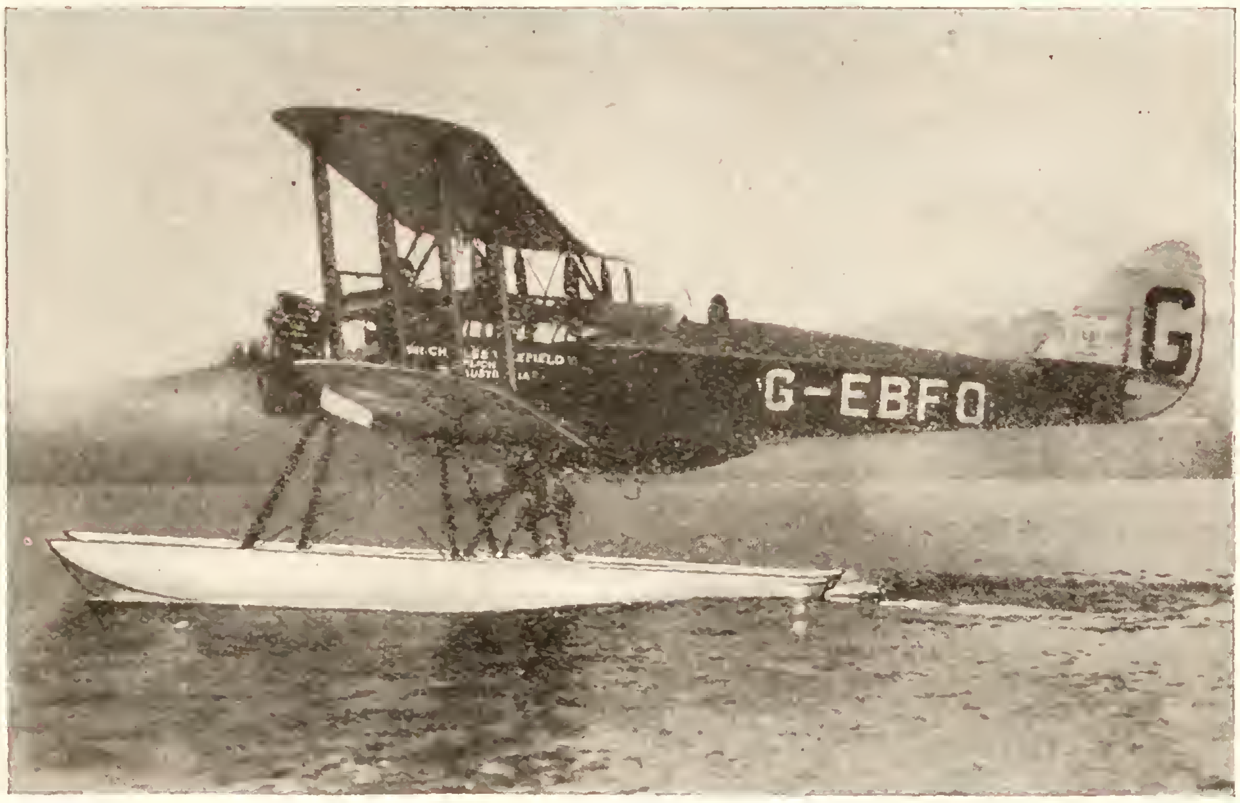
Sir Alan Cobham's flight to Australia.



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These floats, upon which the success of the flight so very largely depended, were specially designed and built by the pioneers of British All-Metal Aircraft.

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ENGLAND-AUSTRALIA-ENGLAND

COBHAM'S MESSAGE TO "FLIGHT" READERS

"Now that the flight is over, my sincere wish is that the great public interest in aviation that we have been so fortunate in creating, at the termination of our flight, will remain permanent in the minds of the people, for then we shall know that a big step has been taken in the progress of aviation, and that the troubles and trials of our flight were well worth while.

"When we departed on June 30 we were out to fly to Australia as quickly as possible, but at the same time we had no definite schedule to work to, and we were not out to break records, for our main object was to fly to Australia through the heart of a monsoon on a seaplane, without any undue risks, and to try and give an impression to the world at large that the flight was not a stunt, but a sound, practical proposition in which we were endeavouring to survey the possibilities of intermediate air routes between London and Australia from a seaplane point of view.

"I would like to state that during the months in which we chose to do the job—July, August and September—it would have been impossible, as we encountered the weather, to have accomplished the flight on an aeroplane, and it was only by being able to alight at any moment on the various waterways we passed over that we were able to get through the various monsoon storms which we encountered.

"I knew little about seaplanes before we started, but I have learnt a lot since, and from my experience the de Havilland 50J Seaplane, in its class, could not have been beaten for the job. The machine itself behaved perfectly throughout the flight, and gave no trouble whatsoever, despite the fact that it was drenched through and through, even worse than if it had been submerged in the sea, and only a few days later was subjected to the glaring sun and the dry heat of 110° in the shade.

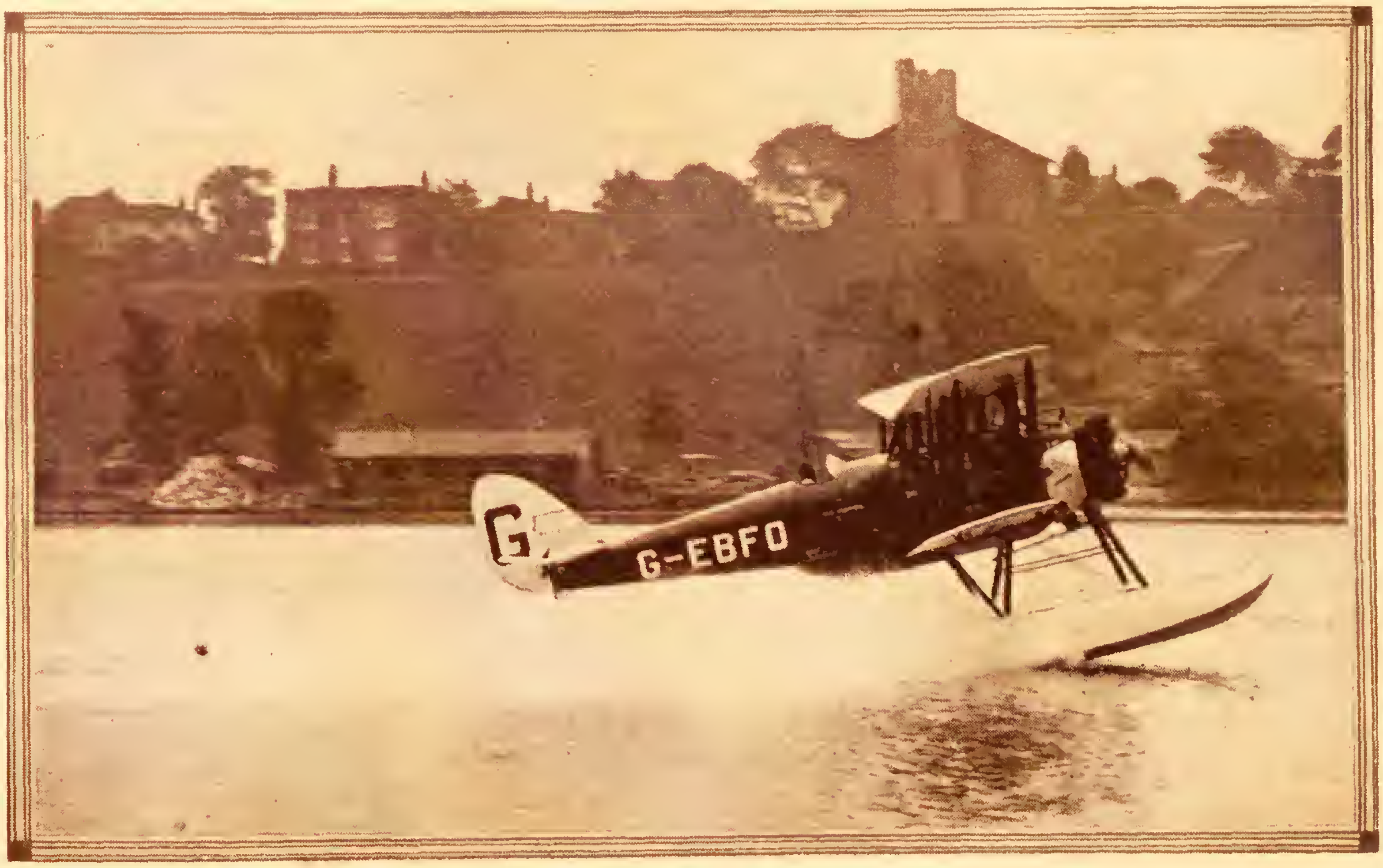
"The Short all-metal floats were perfect in design, inasmuch as we were able to get off the water on all occasions with as much as 1,000 lbs. overload, on a machine whose maximum permissible load was about 4,000 lbs. They remained watertight throughout.

"Regarding the Siddeley 'Jaguar' engine, which in the past has earned for itself the reputation of persistent reliability, it has secured on this flight the distinction of being the first aero engine in history to go across the world and back again without complete overhaul, for the main bearings were never touched at all. Thus, this has been the longest trans-world flight ever accomplished with the same engine. Whether in deluge of rain or in terrific heat, our 'Jaguar' purred without a falter the whole 28,000 miles. There may be aero engines as good as the 'Jaguar,' but I know of no better.

"The tragic death of Elliot almost made me forsake the flight, but I was extremely fortunate when the R.A.F. lent me Sergt. Ward, who proved a stout fellow, and later I was fortunate in securing the additional services of Mr. Capel, at Melbourne, to help us out with the extra work of making two jumps a day, where possible, on the homeward flight.

"The Sir Charles Wakefield Flight to Australia and back was done at the worst time of the year, and I know from past experience how simple it is to fly over that route out of the monsoon period, and therefore I have no fears for the future of intermediate air routes between England and Australia."

Alan J. Cobham



ENGLAND—AUSTRALIA—ENGLAND : Mr. Cobham starting from Rochester on June 30

ENGLAND—AUSTRALIA—ENGLAND

As indicated in last week's issue of Flight, the great England-Australia-England flight has been brought to a successful conclusion, and on October 1 Mr. Alan Cobham arrived back in London, "according to plan." Mr. Alan Cobham's home-coming was made the occasion of a remarkable and historic demonstration, both official and civic—a demonstration which indicated that, after all, we as a nation are capable of recognising, sometimes, the skill and accomplishments of our own history-makers.

Some thousands of people assembled by the river-side at Westminster and elsewhere along the Thames between Gravesend and Hammersmith to pay tribute to the hero of what was undoubtedly the greatest flight in the history of British aeronautics. In fact, last Friday's scenes were unprecedented, and the enthusiasm shown was a fitting tribute to a really splendid achievement.

Mr. Cobham, continuing on the final stages of his flight from Athens, flew on to Naples on September 29, with the intention of proceeding to Marseilles the same day. Weather conditions, however, were against him, and so he made a halt for the night at Orbetello, on the Italian coast, in Tuscany. Early next morning he started off against a strong head-wind for Marseilles, whence he proceeded to Sartrouville, about nine miles from Paris on the Seine, where he arrived shortly before 6 p.m. and was given a hearty welcome by a crowd which had assembled to witness his arrival. He was received by Wing-Commander Smyth-Pigott, Air Attaché from the British Embassy in Paris.

At 11.15 a.m., on October 1, Mr. Cobham and his companions set out from Sartrouville, accompanied by another aeroplane, on the final stage of the flight. Flying via Rouen and Dieppe, they crossed the Channel and arrived over Hastings at 1.18, where a vast crowd had gathered on the front and cheered the machine as it passed, circling the castle before heading for Maidstone. They passed over the latter place at 1.37 and then proceeded to Rochester—the original starting-point of the flight—where, just before 2 p.m., they were received with much enthusiasm, rockets being fired and hundreds of people cheering as the D.H.50 circled the Medway.

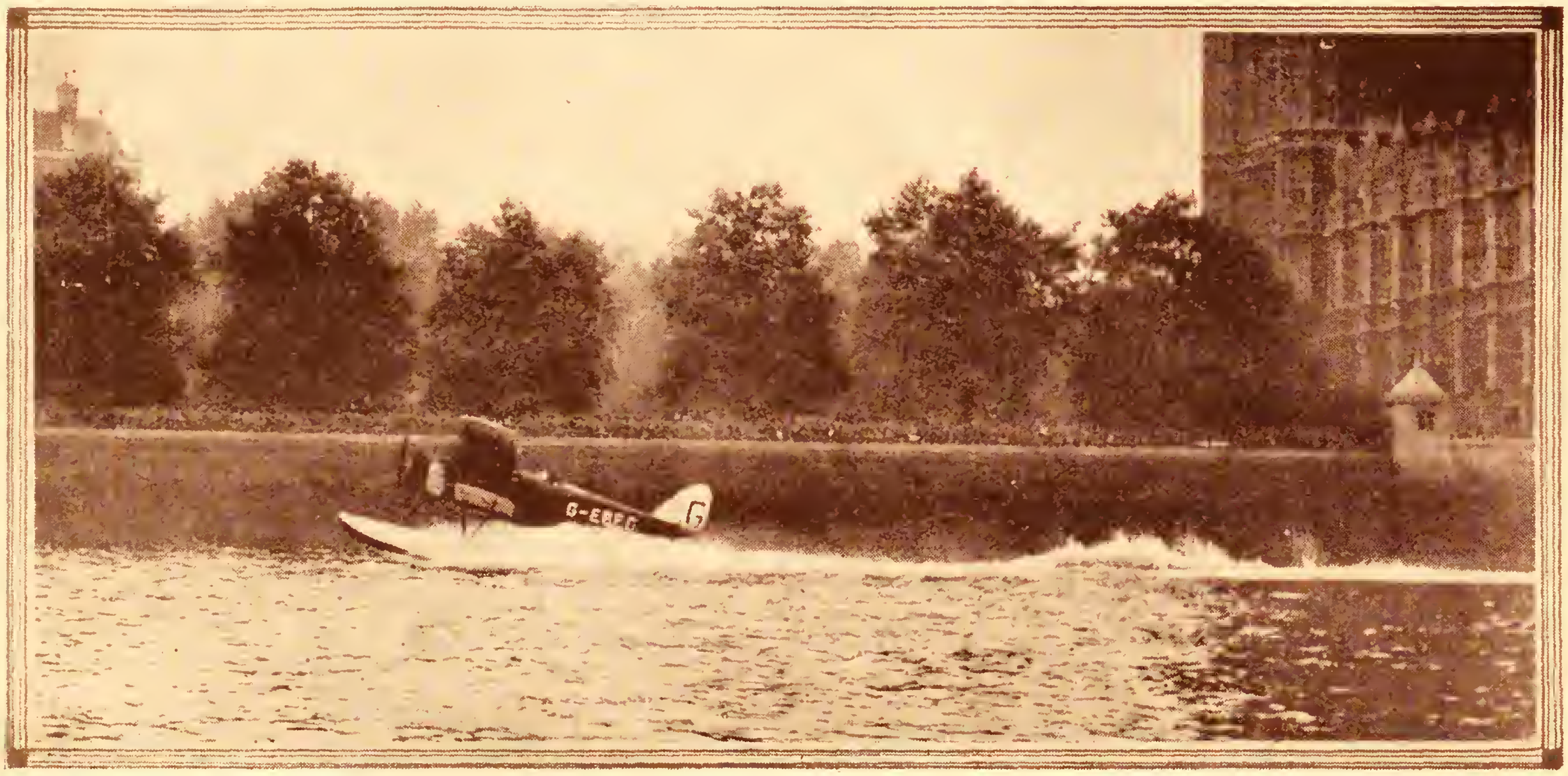
From here Cobham proceeded up the Thames, and as he progressed towards London the crowds of spectators lining every vantage point along the banks became larger and larger. Cheers and blowing of sirens greeted them all the way up to the Tower Bridge, which was reached by 2.12 p.m.

In the meantime vast crowds had collected on the embankments in the vicinity of Westminster, as well as on the roofs of all buildings near by. Victoria Tower Gardens and Albert Embankment were black with people, while Westminster Bridge, in spite of the efforts of the police to keep it clear, was thronged with spectators even up to the time of Cobham's arrival. Numerous launches and other water craft, some decorated with flags, were moored at points of vantage opposite the Houses of Parliament, and everywhere there was a hum of excitement.

By 2 p.m. the Terrace of the House of Commons was well filled by a distinguished gathering, amongst those present being: The Right Hon. Sir Samuel Hoare, Secretary of State for Air; Air Vice-Marshal Sir P. W. Game, Air Vice-Marshal

"Flight" *Photograph*

HOME! The D H.50J (Siddeley "Jaguar") seaplane, piloted by Mr. Alan Cobham, accompanied by Sergt. Ward and Mr. Capel, "flies past" the Houses of Parliament, at the finish of the 28,000-mile flight to Australia and back, on October 1, 1926.



THE FINISH OF THE ENGLAND—AUSTRALIA—ENGLAND FLIGHT: Mr. Alan Cobham alighting on the Thames opposite the Houses of Parliament at Westminster, October 1, 1926.

125,000 MILES

THE actual D.H. Type 50 Seaplane on which Sir Alan J. Cobham has just completed his wonderful flight of 28,000 miles to AUSTRALIA AND BACK has now covered 125,000 miles, including the journeys to Rangoon and back and Cape Town and back.

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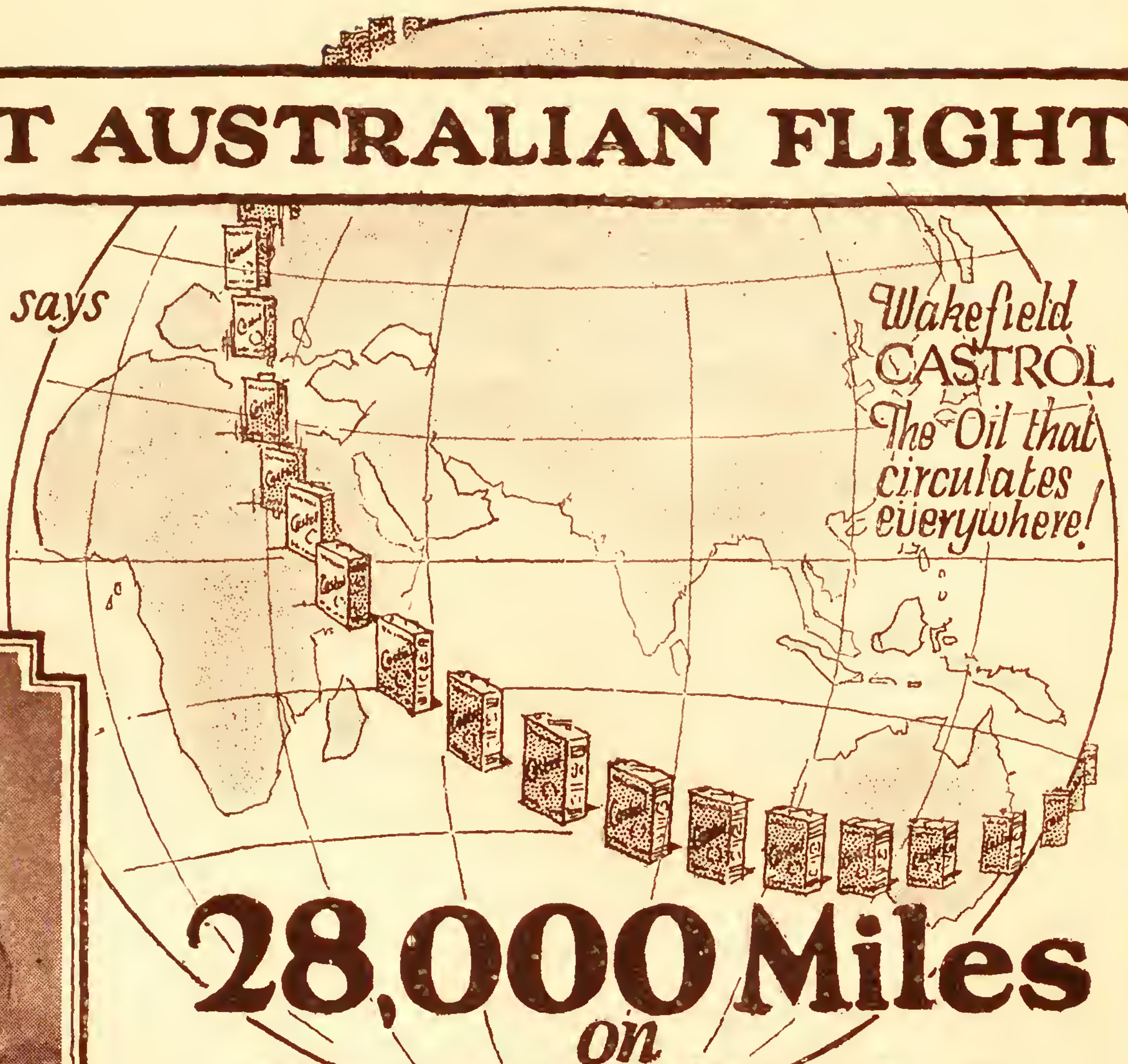
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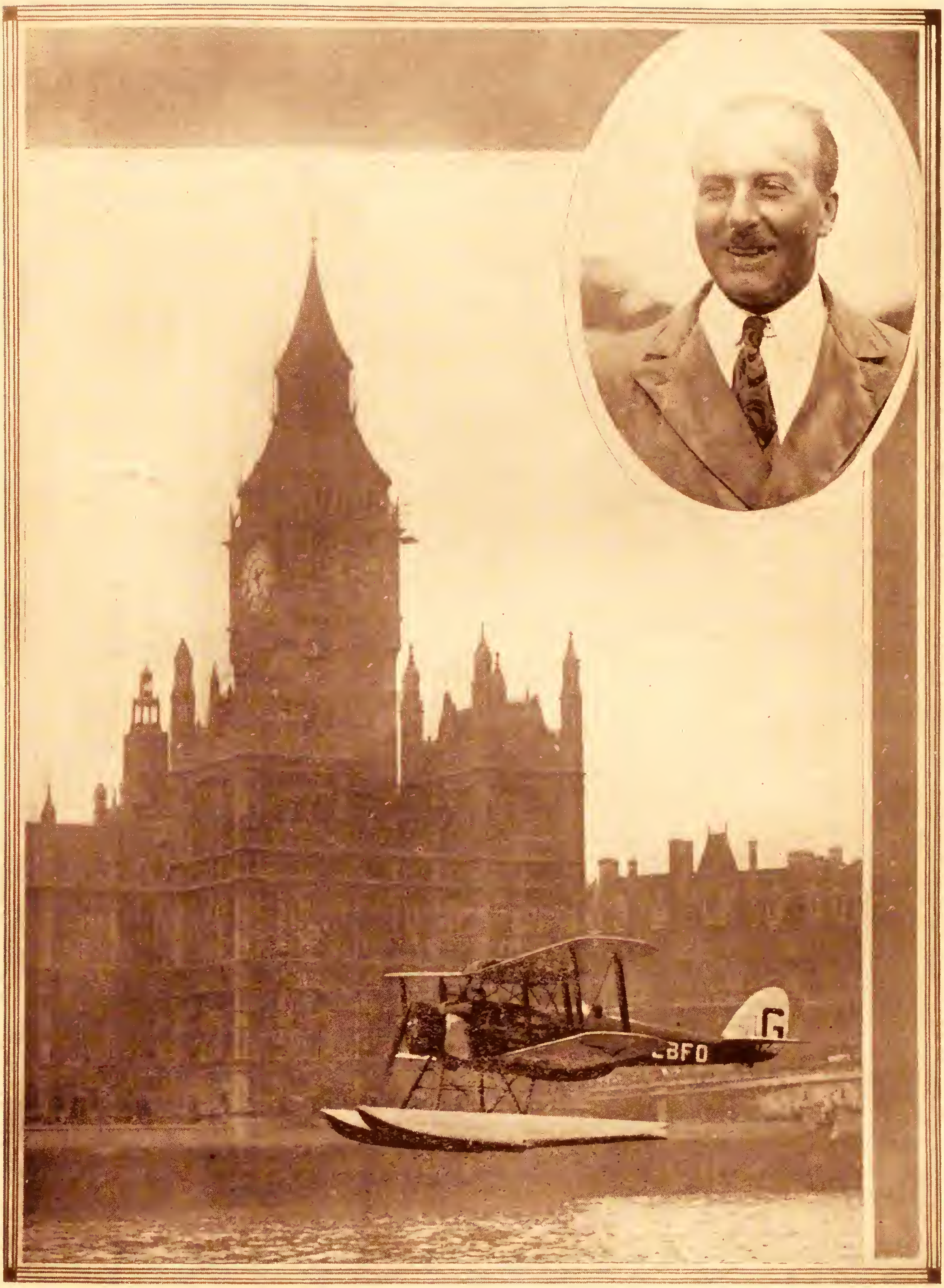


THE FINISH OF THE 28,000-MILE FLIGHT: The D.H.50J (Siddeley "Jaguar") seaplane, piloted by Alan J. Cobham, crossing the line, on October 1, 1926, at—according to the "Time-keeper"—2.27 p.m. Inset, "Alan J." still smiling

Sir Sefton Brancker, Prince Feisal, the Maharaja of Burdwan, the High Commissioner for Australia and Dame Mary Cook, the Speaker of the House of Commons, the Duke of Sutherland, the Marquis of Lincolnshire, Viscount Burnham, Viscount and Viscountess Chelmsford, Lord Thomson, the Mayor of Westminster (Councillor G. H. Heilbuth) and the Mayoress, preceded by the Mace-Bearer (special permission having been given for carrying the mace into the precincts of the House) Sir Charles Wakefield, Bt., and Lady Wakefield, Lieut.-Col. Moore-Brabazon, M.P., Sir Newton Moore, M.P., Sir F. Hall, M.P., Sir R. Waterhouse, the Right Hon. J. Ramsay MacDonald, M.P., and Miss Ishbel MacDonald, the Right Hon. T. P. O'Connor, M.P., the Right Hon. J. H. Thomas, M.P., Colonel de Satagé, Capt. Ian Fraser, M.P., Mr. J. D. Cassels, K.C., M.P., Mr. J. M. Erskine, M.P., Mr. George Balfour, M.P., Mrs. and Miss Porteous (the aunt and cousin of Mr. Cobham), and officials of the De Havilland Company.

At 2 o'clock, when Cobham was expected to arrive, all eyes were turned eastward, and one could almost feel the intense excitement that prevailed all around. Weather conditions were ideal, there was very little wind, and the sun was shining through scattered clouds.

Suddenly, at 2.13 p.m., a shout went up "There he is!" and the D.H.50J appeared over the County Hall, flying comparatively slowly at a few hundred feet, with the engine purring proudly. Instantly there was a spontaneous roar of cheering, a blowing of sirens and motor horns, and as the machine flew past the "House" towards Hammersmith, we could see the occupants waving their arms to the crowd below. The machine passed quickly out of sight, following the course of the river, and all the way up to Hammersmith, where Cobham made a wide circle before turning back, large crowds of people sent up a mighty cheer.

England-Australia-England, Going Ashore: Mr. Cobham and his engineers, Sergt. Ward and Mr. Capel, leave their hardy D.H.50J seaplane, after alighting on the Thames, and proceed by boat to the House of Commons Terrace, where official welcome awaited them.

Eight minutes later the machine returned to Westminster and, after flying two or three times past the Houses of Parliament, Cobham came in low over Westminster Bridge—now completely blocked with vehicles and pedestrians—and, with a brief side-slip, gently alighted on the Thames—at 2.27 p.m.—right opposite the Terrace. As the machine came to rest a motor launch dashed up alongside and took the seaplane in hand, whilst Cobham and his companions climbed out and got into another boat, which conveyed them to the Terrace steps.

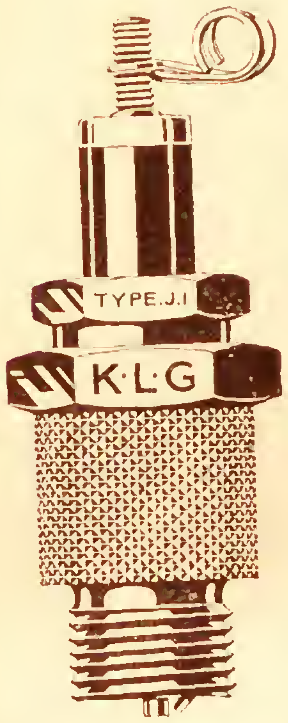
All this time the cheering never ceased, but increased in volume as Cobham was seen to dash up the steps—three at a time—and embrace Mrs. Cobham, who was awaiting him at the top of the steps. Sergt. Ward and Mr. Capel followed shortly after. After a short interval, the party, including the Speaker (Mr. J. H. Whitley), Sir Samuel Hoare and Sir Sefton Brancker, proceeded to the Speaker's house, where a private reception was held, after which they made their way—with difficulty—through the crowd to the official reception enclosure on the Terrace, when the airmen were officially welcomed by Sir Samuel Hoare.

Sir Samuel then read the following message from the King:

"On your safe return from Australia, I offer you a cordial welcome home and congratulate you heartily on the successful termination of yet another historic flight.

"George R.I."

After reading this message, Sir Samuel said he was proud it was his good fortune, on behalf of the British People, to offer a welcome to Mr. Cobham and his two colleagues on one of the most historic sites in the centre of the Empire, where several generations of the ablest men of note in the service of the State had been received from year to year. It was the first occasion on which the Terrace at Westminster had received one of the great pilot pioneers of the Empire, and



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Works: Rugby, Birmingham, Willesden, Coventry and Chesterfield.

he hoped that in future there would be a succession of such pioneers coming among them. The flight to Australia and back was not the first of Mr. Cobham's great flights. He held the record of being the first civilian pilot to make an organised flight to India, over a distance of more than 16,000 miles. Shortly afterwards he made a flight to South Africa, covering more than 17,000 miles. That day they welcomed him back from a flight which extended over 28,000 miles, through great diversities of climate, in the heat and terrible weather, over wide expanses of dangerous sea, covering a distance that exceeded the whole extent of the circumference of the world. Mr. Cobham, by his achievement, had done more than politicians sometimes did to bring the people of the Empire more closely together, both in body and in mind. The thanks of the country were also due to the wives and families of both Mr. Cobham and of both the mechanics, for without them this great achievement would have been impossible. A word of sympathy was also to be said for the mother of Elliott, who so tragically lost his life in Iraq. They must not forget also the wonderful machine in which the flight was achieved. The D.H.50 had now broken every record for long-distance flight, and was a wonderful tribute to the excellence of British workmanship.

"Lastly," concluded Sir Samuel, "I should like to say a word of thanks to Sir Charles Wakefield, without whose support this flight might never have taken place at all. Sir Charles Wakefield bears a name greatly honoured in the City of London. Time after time he has supported British flying, and I cannot do better, it seems to me, in thanking him today, than to say I hope that in every enterprise he supports he will always have such splendid helpers to carry it out as he had in the case of Mr. Cobham and his two colleagues. May British flying always have the support of far-seeing and generous patrons like Sir Charles Wakefield, for if we have that support, backed up by the help of public opinion generally, British flying will progress much more quickly than would otherwise be the case. In your name I end by offering your congratulations to our three friends, and by wishing them good luck in every future flight they may make, either separately or together. I ask you to give them three cheers."

The Mayor of Westminster then offered congratulations on behalf of the citizens of Westminster.

In a cordial speech of welcome, Sir Charles Wakefield said that Mr. Cobham needed no assurance that his fellow countrymen welcomed him. In every corner of this kingdom and Empire men and women had been watching the progress of this wonderful flight, and at this moment were saying to one another, "I wish I could be there." Sir Samuel Hoare had spoken for the Government. As a private citizen, he (Sir Charles) would speak for all those citizens of the Empire who were with them that day in spirit, though distant in terms of space.

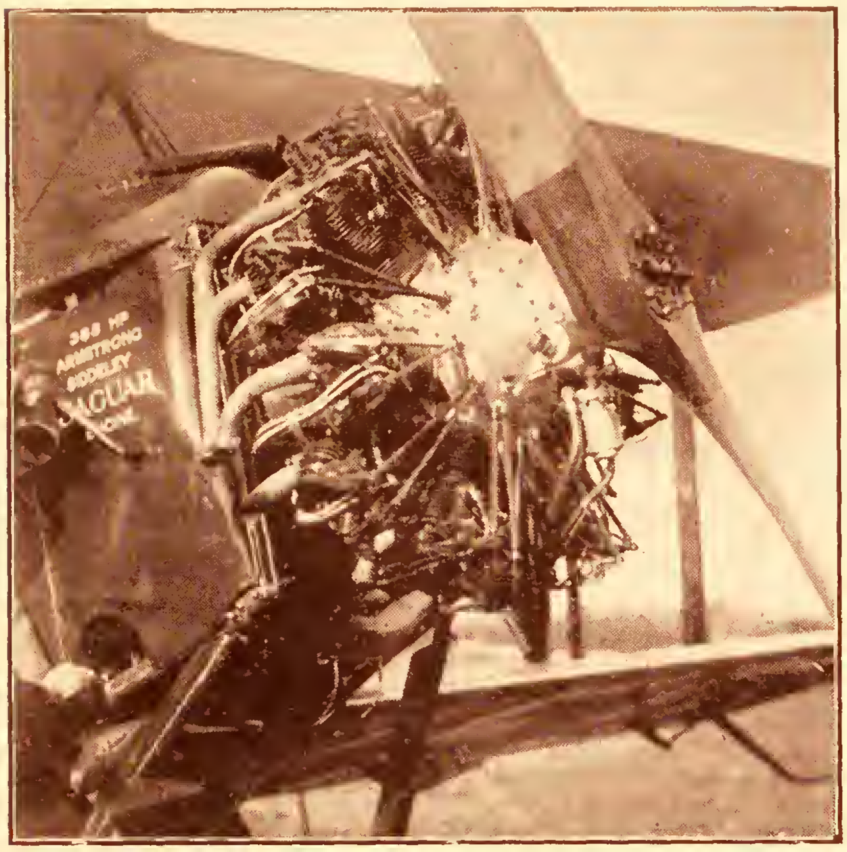
The flight, he said, had demonstrated that Great Britain was not decadent. The spirit of adventure that looked to the heights, and the secret of mastery that achieved them, were still part of our national heritage. He was proud to have had his name associated with this splendid achievement, which was from first to last a personal triumph for Mr. Cobham, and would have a unique place in the history of Imperial aviation. Every heart responded to the great deed planned, attempted, and achieved. In the years to come Cobham's landing on the waters of the capital river of the Empire after his great pioneering flight of survey would take rank among the historic moments of our national story. We, who had the privilege of witnessing what others would record with pride, thanked him and congratulated him on the triumphant conclusion of a great Imperial task.

Then, midst more cheering, Mr. Cobham rose to reply, saying that day was a very proud one for him. It had been in his mind ever since he started that when he got back he would like to land on the Thames, if only in order to bring home to the British public that flying was not such a stunt as some people thought it was. The flight to Australia was no stunt, remarked Mr. Cobham, it was done to try to find out what they could, and he assured them they had found out a lot in the face of severe difficulties. He could never have carried out the flight if it had not been for the hundreds of people who had helped him, particularly the designers of the machine, the makers of the engine, the all-important floats, and the hundreds of people along the route to whom he wrote. "There must have been," said Mr. Cobham, "a hundred people to whom I wrote, asking them to do something for me without offering anything in return, and because they believed in aviation or in what I was trying to do every one of them helped me. Some of them had never seen an aeroplane before."

ENGLAND—AUSTRALIA—ENGLAND : Everybody Happy! Mr. Alan Cobham (smiling), Sir Samuel Hoare (also smiling) and Sir Charles Wakefield (smiling also) on the Terrace of the House of Commons at the conclusion of the big Flight.

Mr. Cobham referred to the death of Mr. Elliott, his mechanic, who was shot in the desert, an occurrence which he described as "that terrible tragedy of Basra, when I lost Elliott."

He also paid a glowing tribute to Ward, the mechanic, who took his place. "Ward only knew the engine by theory, and nothing about seaplanes, and it speaks very well of him that we were able to get right through and home again without a hitch. I knew the terrific job it would be to fly two jumps a day with only two of us—perhaps eight hundred or a thousand miles a day—so I asked Capel if he would like to come back with us, and he said he would. I don't know what we should have done without him."



17,000 + 28,000 = 45,000 : The Armstrong Siddeley "Jaguar" which accomplished its second big task without a falter.

Referring to his welcome, he said there must have been a million people watching his machine land. "I hope the success of the flight does not end here," he added. "I do hope that all the people of Britain will realise the great importance flying is going to be to the future of everybody. If they do, then I shall be happy in the thought that we

["Flight" *Photograph*

BRAVO! ENGINEERS : Mr. Capel, of Armstrong Siddeley Motors ,and Sergt. Ward, R.A.F., who looked after the needs of the "Jaguar" engine—a task calling for constant watchfulness, and often hard work after the day's flight.

["Flight" *Photograph*

ENGLAND—AUSTRALIA—ENGLAND : Our picture shows the official welcome given to Mr. Cobham on the Terrace of the House of Commons, October 1, 1926, at the successful conclusion of the flight. Sir Samuel Hoare, Secretary of State for Air, is seen making his speech, and on either side are Mr. and Mrs. Cobham. Among those present may be recognised Sir Chas. Wakefield, the Mayor of Westminster, Sir Sefton Brancker, the Duke of Sutherland, Lieut.-Col. Sir Francis McClean, the Speaker (the Right Hon. J. H. Whitley), etc.

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They were fitted to the "Jaguar" Engine used by

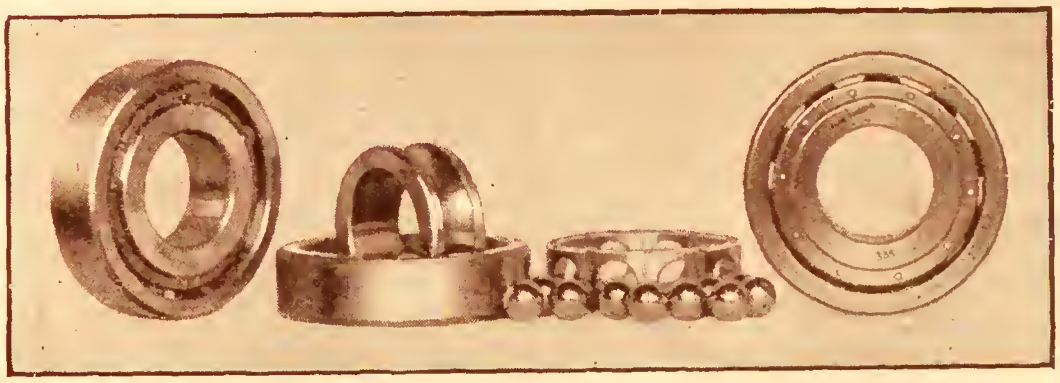
Sir Alan J. Cobham

in his

Australian Flight

just completed, their behaviour under these exacting conditions being perfect. They were used also on his earlier achievement,

The Flight to the Cape



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Lieut. Sir A. Whitten Brown, K.B.E.

◆

The first flight from Cairo to South Africa *(Bulawayo)*

Feb. 22nd. to March, 5th. 1920.

Col. Sir Hesperus P. Van Ryneveld, K.B.E., D.S.O., M.C.

Sqd. Ldr. Sir C. J. Quinton Brand, K.B.E., D.S.O., M.C.,

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Nov. 12th. to Dec. 10th. 1919. — *27 days, 21 hrs.*

Capt. Sir Ross Smith, K.B.E., M.C., D.F.C.

Lieut. Sir Keith Smith, K.B.E.

◆

The first flight from London to Central Africa *(Tabora)*

Jan. 24th. to Feb. 27th. 1920.

Capt. S. Cockerell, A.F.C.

Capt. F. C. Broome, D.F.C., A.F.C.

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have achieved our task in finishing the flight right back here to Westminster. I thank you very much indeed."

Mr. Cobham then sat down, but immediately rose again, and turning to Sir Samuel Hoare, said that he had with him a very important mail which he had carried from Australia, and thought that he had better hand them over —adding that he thought that he had beaten the boat.

Mr. Cobham then produced a sealed packet addressed to the Colonial Secretary, which, he explained, contained a letter from the Governor-General of Australia to the King, and another to Mr. Amery, the Secretary of State for the Dominions. He also brought letters from Mr. Bruce, the Prime Minister of Australia, to Sir Samuel Hoare, to Mr. Amery, to Lord Southborough, and, among other people, to Lord Haig, Sir Charles Wakefield and Mr. Lloyd George.

At the conclusion of the official reception, Mr. Cobham and Mrs. Cobham then made their way, not without some difficulty, to the Press room, where Cobham stated that the important point was that the whole flight had been carried out without any delay due either to machine or engine, so that from a mechanical point of view the aeroplane was as near perfect as any form of transport could be. The journey had enabled them to revise their first idea of the best seaplane bases along the route, while the experience of the monsoons would help considerably when the time came to plan out actual air routes. Much valuable data had been lected for this purpose. The route from Calcutta to Port Darwin was, he thought, ideal for seaplanes, and, in spite of the monsoons, which lasted only for a definite period each year, he believed that, with proper weather report systems, a high degree of regularity in an air service could be maintained.

"I believe also," he added, "that the flight will give a tremendous fillip to aviation in Australia. I am surprised

[" FLIGHT " *Photograph*

ENGLAND—AUSTRALIA—ENGLAND : Above, the Godfather of the Big Flight, Sir Chas. Wakefield, says a few words of welcome, and below, " Alan J." responds, then (right) delivers the mail, etc., brought back from Australia.

at the wonderful reception we got in that country, and undoubtedly the Australian people realised that the flight was a demonstration of the utility of flying. Two days after he landed in Australia an aeroplane club was formed, followed by others in Melbourne and Adelaide. The chief benefit of flying in Australia will be reaped by the private owner, as isolation will be done away with. Even now some of the farmers' sons are pottering about in light Moth machines, and the development of this sort of thing will alter the whole country."

Another enthusiastic reception awaited Mr. and Mrs. Cobham as they at last managed to break away and left Palace Yard in a motor car for home—and Alan jnr.—for large crowds had waited patiently outside to see them depart. In conclusion, we have pleasure in recording the honour which, just as we bring our story of the big flight to a close, we learn His Majesty has been pleased to confer upon Mr. Cobham, and so we feel sure our readers will join us in offering Sir Alan J. Cobham the heartiest of congratulations.

[" FLIGHT " *Photograph*

HIP ! HIP !! HIP !!! Sir Samuel Hoare, Secretary of State for Air, calls for three cheers for Mr. Cobham, and these are given with a will, especially, as will be seen from our photo, on the part of the Mayor of Westminster, Sir Sefton Brancker, and the Duke of Sutherland (standing on Sir Samuel's left).

Items of Interest in the Australian Flight

People who were unable to see the finish of the Australian flight on Friday were, thanks to the B.B.C., able to hear it instead. The proceedings were broadcast from 2LO and Daventry, and a realistic impression of this historic event came through the ether very well indeed. First of all the cheering and blowing of sirens, accompanied by the noise of Cobham's engine as he flew past, was heard, after which there was a short interval during which only a babel of voices, cheering, and other noises came through. Then the cheering rose again and Cobham's voice was heard saying " How do you do, everybody ? I am glad to be back again. I must say it is a very wonderful reception, and I thank everybody very much indeed." Following this came the various speeches.

It may be of interest to note that while the concluding scenes of the big flight were taking place, some 300 Armstrong-Siddeley agents were lunching at the Armstrong-Siddeley Works in Coventry. They were able, however, to hear Cobham's " Jaguar " engine, the speeches, etc., by means of the wireless broadcast. On Saturday night Cobham broadcast a talk on the Australian flight from 2LO.

The Mayor of Camberwell sent the following telegram :—

" Alan J. Cobham, pioneer of Imperial air service, care of House of Commons.—The citizens of Camberwell, your native borough, welcome you home and tender you their hearty congratulations on your series of magnificent achievements, culminating in your success of to-day, linking by airway the Dominion of Australia with the Mother Country."

Official recognition of the flight also comes from Australia in the form of a congratulatory telegram from Mr. Page, on behalf of the Commonwealth Government and Mr. Bruce :—

" Warmest congratulations on the final success of your great attempt. Your flight to Australia was a wonderful achievement under tragically adverse circumstances. You have capped it now in your triumphal return. Your feat is greater and more pregnant with hope for the future of Empire communication in that it encountered and surmounted every possible obstacle. The whole of Australia will rejoice in your exploit and safe return."

Mr. Cobham took 37 days to fly from England to Port Darwin, Australia—a distance of approximately 11,380 miles —then another eight days (after the D.H. 50J had been changed to a land machine) in flying to Melbourne, some 2,650 miles. On the homeward journey Mr. Cobham was five days on the 2,230-mile journey across Australia back to Port Darwin. From here the flight home, over the same route as before, occupied 28 days. Thus, Mr. Cobham has covered a total distance, in round figures, of 28,000 miles in 78 days, exclusive of the stops at Port Darwin and Melbourne, or in a total flying time of over 320 hours.

It may be of interest to note here that Sir Ross Smith, when he flew along much the same route from England to Port Darwin in Nov.-Dec., 1919, took 29 days for the journey.

In order to show, at a glance, the progress of Mr. Cobham's England-Australia-England flight from start to finish, we have prepared the following log, or " time-table." The dates on the left indicate, reading downwards, the daily progress on the outward journey, the figures in brackets being the *approximate* distances in miles for each daily stage—as the " crow flies " and not, in some cases absolutely as Mr. Cobham flew.

If we then read *upwards*, the dates on the right will show the daily progress on the homeward journey, together with the mileage.

Concerning the sketch-map on page 657, in this the *approximate* mileages covered in each stage are given. The route followed is shown as a series of straight lines from one port of call to another, although, naturally, Cobham frequently had to make detours.

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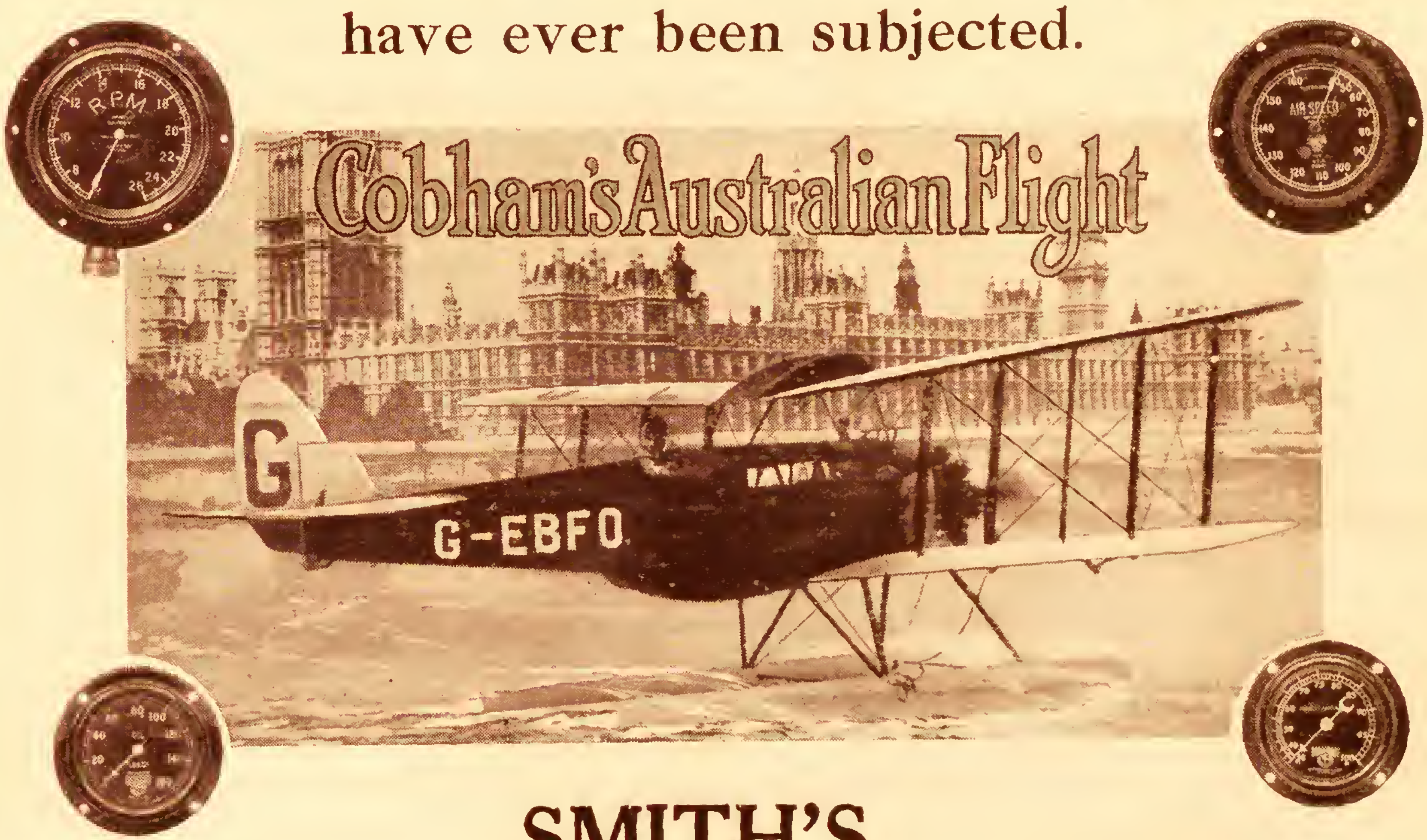

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Speed and Revolution Indicators, Altimeter, Oil and Temperature Gauges, were used throughout this 28,000 miles flight.

Sir Alan Cobham telegraphed:
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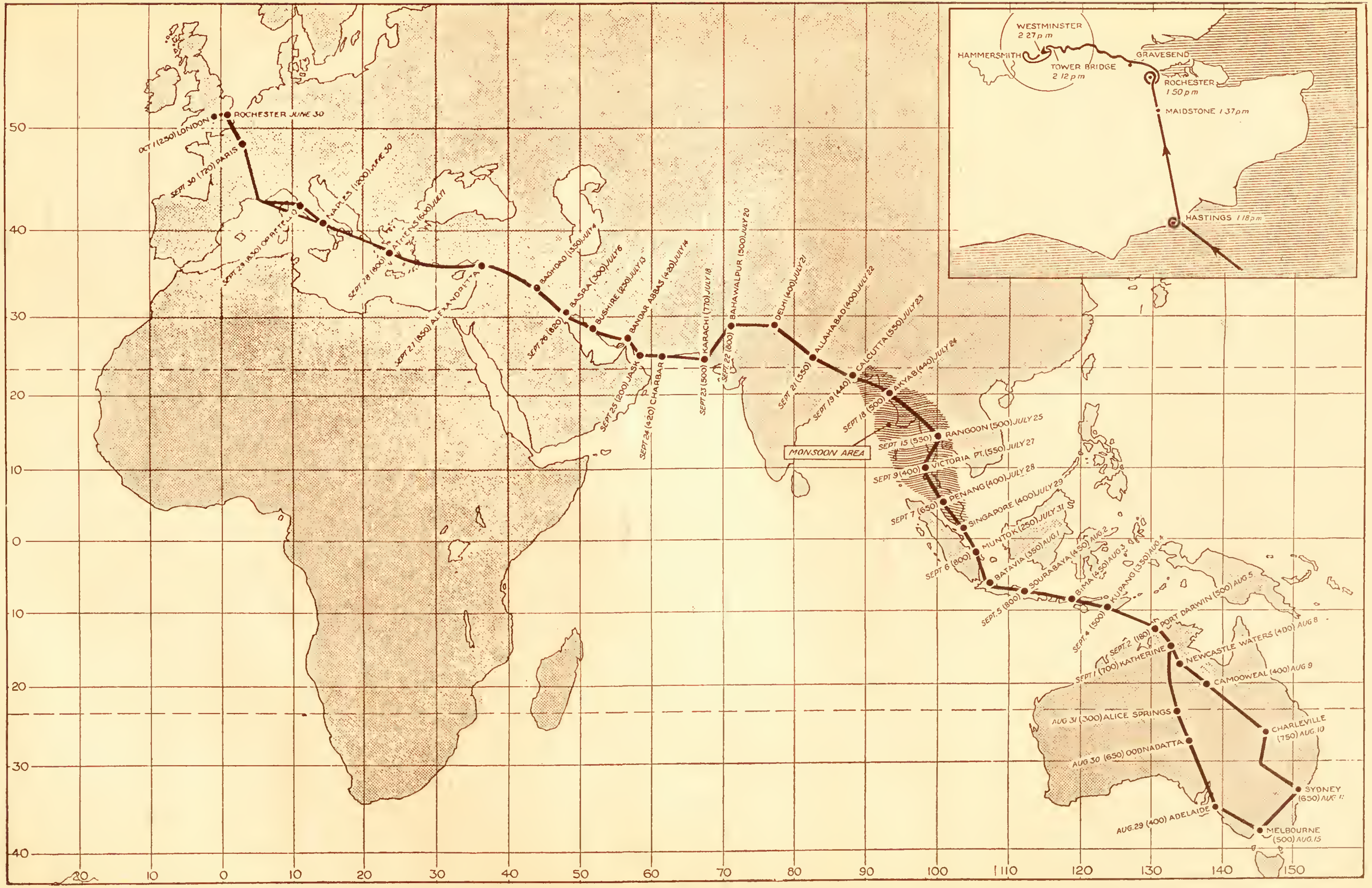
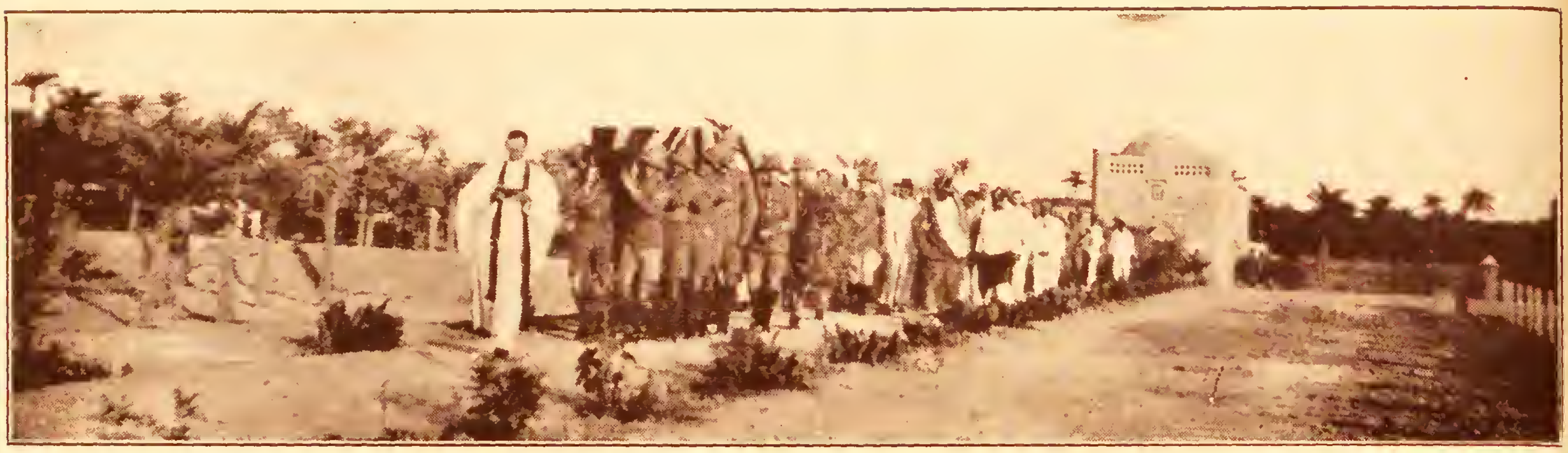


ENGLAND-AUSTRALIA-ENGLAND : Sketch map, showing the route taken by Mr. Alan Cobham on both out and home trips. The dates *above* the line indicate the day of arrival at various places on the outward route—those *below* the line refer to the home journey. The figures in brackets give in each case the *approximate* mileage of each daily stage. Inset : The route taken in the concluding or "home" section of the flight.



THE ONE TRAGEDY OF THE GREAT FLIGHT: The funeral of Mr. A. B. Elliott, Cobham's trusty companion and mechanic, at Basra. Elliott, who accompanied Cobham at the start, was shot by an Arab as they flew from Baghdad to Basra.

1926.		1926.
June 30 (start)	Rochester (London)	Oct. 1 (250)
	Paris (Sartrouville)	Sept. 30 (720)
	Marseilles*	
	Orbitello	,, 29 (830)
June 30 (1,200)	Naples*	
July 1 (600)	Athens	,, 28 (800)
	Leros*	
	Alexandretta	,, 27 (850)
,, 4 (1,350)	Baghdad*	
,, 6 (300)	Basra	,, 26 (820)
,, 13 (250)	Bushire*	
,, 14 (420)	Bandar Abbas.	
	Jask	,, 25 (200)
	Charbar	,, 24 (420)
,, 18 (770)	Karachi	,, 23 (500)
,, 20 (500)	Bahawalpur	,, 22 (800)
,, 21 (400)	Delhi*	
,, 22 (400)	Allahabad	,, 21 (550)
,, 23 (550)	Calcutta	,, 19 (440)
,, 24 (440)	Akyab	,, 18 (500)
,, 25 (500)	Rangoon	,, 15 (550)
,, 27 (550)	Victoria Point	,, 9 (400)
,, 28 (400)	Penang	,, 7 (650)
,, 29 (400)	Singapore.	
,, 31 (250)	Muntok	,, 6 (800)
Aug. 1 (350)	Batavia.*	
,, 2 (450)	Sourabaya	,, 5 (800)
,, 3 (450)	Bima.	
,, 4 (350)	Kupang	,, 4 (500)
,, 5 (500)	Port Darwin	,, 4 depart)

* Intermediate stops on homeward journey.

Australian Section.

Out.

Aug. 8.	Port Darwin.
,,	Newcastle Waters (400).
,,	Brunnett Downs.
,, 9.	Camooweal (350)
	Cloncurry.
	Longreach.
,, 10.	Charleville (750).
	Bourke.
	Narromine.
,, 11.	Sydney (650).
,, 15.	Melbourne (500).

Home.

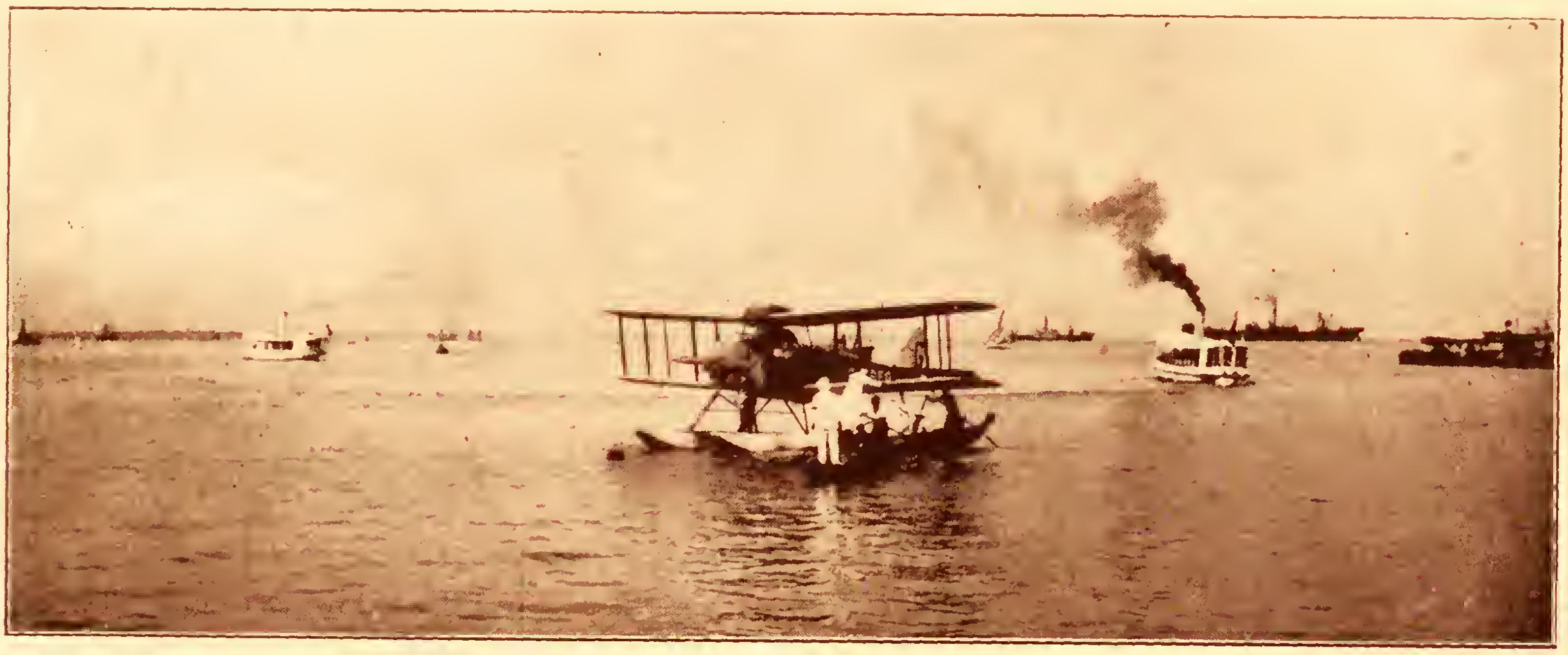
Aug. 29.	Melbourne.
,,	Adelaide (400).
,,	Maree.
,, 30	Oodnadatta (650).
,, 31.	Alice Springs (300).
	Banka.
Sept. 1.	Katherine (700).
,, 2.	Port Darwin (180).

Full credit for the skill, endurance and courage having been given to the human side of this great flight, it must be remembered that it also constitutes a wonderful triumph for all British aircraft construction and design. The 28,000 miles flown was accomplished with the same engine and machine from start to finish.

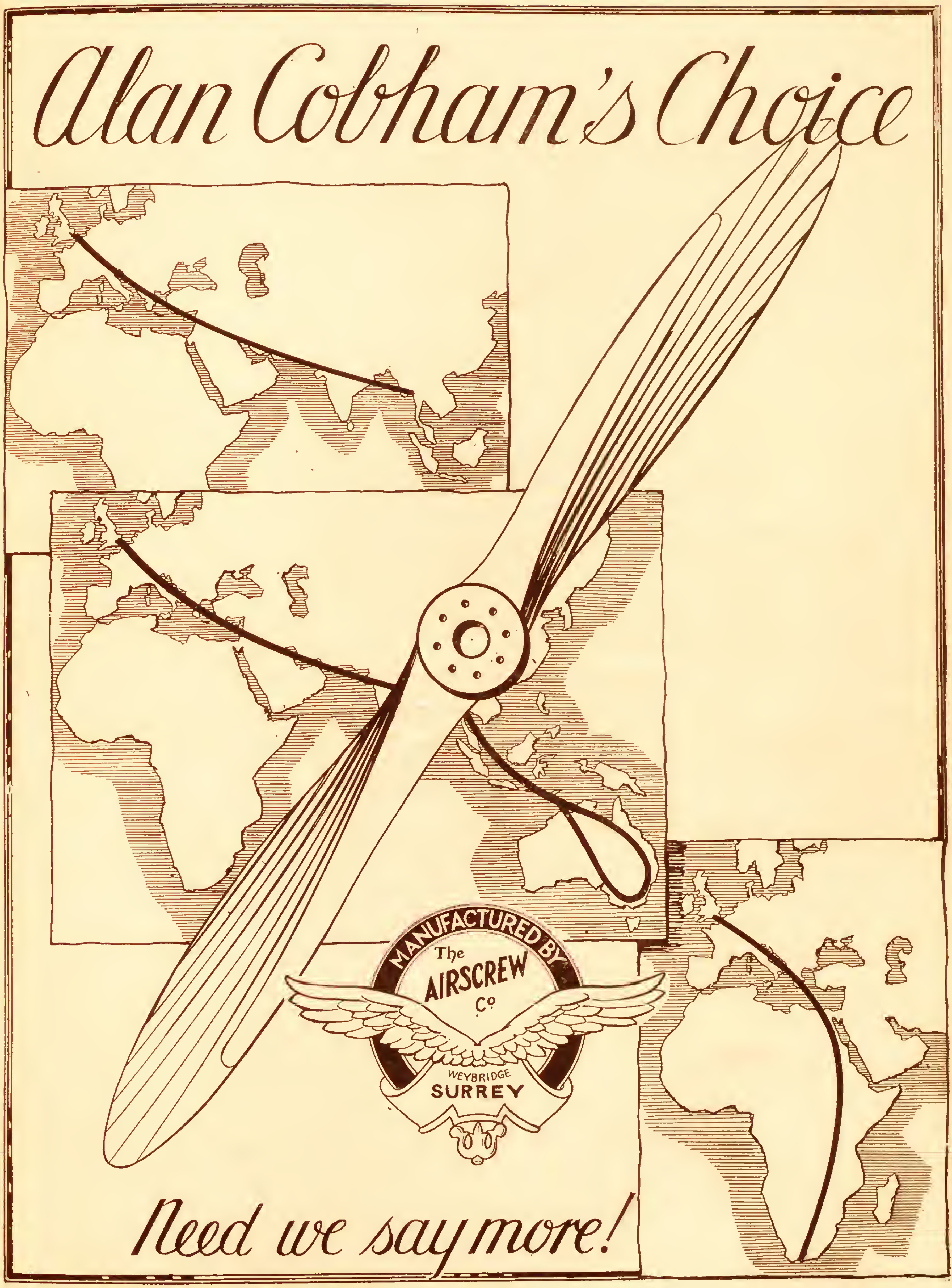
The 385 h.p Siddeley-Jaguar engine is all-British and was made at Coventry. It is the identical one with which the flight from London to Capetown and back was made last spring.

During this present flight there has been no complete overhaul of the engine, which is probably a world's record for a long-distance journey under such conditions.

The machine is a real old war-horse with a record of pioneer flights that should make her worthy of the British Museum. The De Havilland 50 G.E.B.F.O. was built in 1923 and did many big trips about Europe. It was the first machine to fly from London to Africa in the day.



ENGLAND-AUSTRALIA-ENGLAND: The arrival at Singapore on July 29 during the outward journey. Mooring the D.H.50 for the night.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125,000 miles

including

TO INDIA AND BACK
TO THE CAPE AND BACK
TO AUSTRALIA AND BACK

was made with

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and is still in perfect condition.

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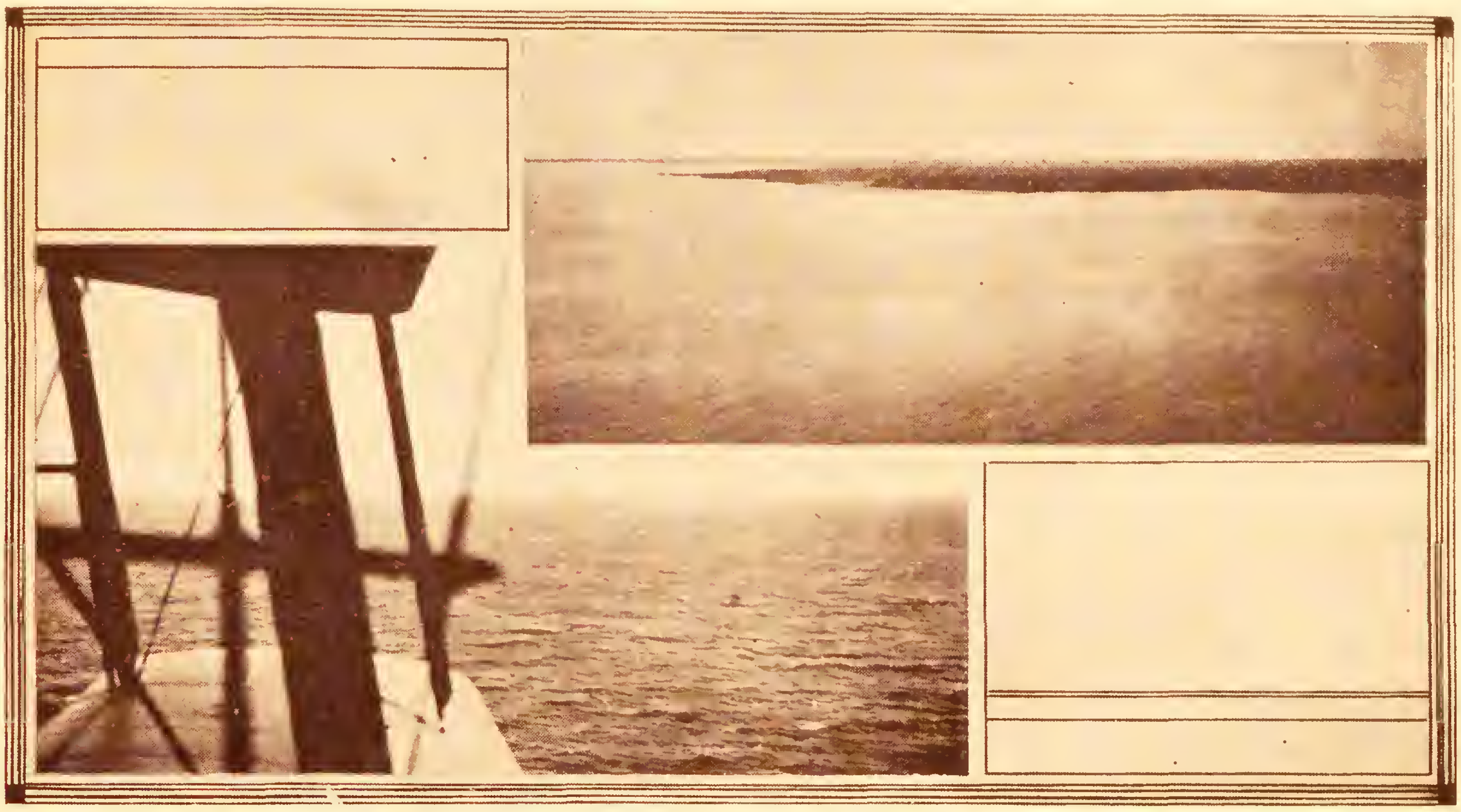
Then, in 1924, G.E.B.F.O. flew from London to Rangoon and back, when Cobham piloted Sir Sefton Brancker on his flight of survey.

Then it went to the Cape and back and now, fitted with a pair of Short's all-metal floats, has flown from England to Australia and back.



ENGLAND-AUSTRALIA-ENGLAND : The concluding stage of the outward journey. On the left a view from the machine of the open sea during the 500-mile jump from Kupang to Port Darwin, and, on the right, the first glimpse of Australia.

It is well seasoned, and since it left England on June 30 last has had every imaginable extreme of climate, from the burning sun of Africa to the freezing cold of Northern Europe and the drenching rains of the Burma monsoon.

Special mention must be made regarding the Short all-metal floats, on which much depended, and which have come through their ordeal with flying colours.

ENGLAND-AUSTRALIA-ENGLAND : At Port Darwin, Australia, the D.H.50J was changed from a seaplane into a land plane on the outward journey, and *vice versa* on the home trip. Our picture shows some men of the Australian Navy assisting in this operation.

Of other contributions towards the success of the Australian flight, must be mentioned the arrangements for the supply of petrol along the route—the " B.P " Co. from England to Charbur, the Burma Oil Co. from Charbur to Rangoon, and Shell Mex Co. thence to Melbourne.

The magnetos used on the Siddeley " Jaguar " are the identical two B.T.H. machines which were used on the previous flight to Capetown. Although the magneto is such a small machine, its function is all-important, for unless sparks are produced with unfailing regularity, the engine must fail to operate.

To start for Australia with the same magnetos which had experienced such severe conditions as those of the Capetown flight is evidence of very great confidence in this small but essential part of his equipment, and it is, therefore, even more gratifying to know that, in spite of the torrential rains, heat, cold and exposure which have been experienced, this confidence has not been misplaced. The magnetos in question are two of the 14-cylinder aeroplane engine type made by the British Thomson-Houston Co., Ltd., Coventry.

Also, the "Titanine" doped fabric was in the same excellent condition at the finish as it was at the conclusion of the London-Cape-London flight.

The plywood of the fuselage, supplied by the Aeronautical & Panel Plywood Co., Ltd., was also in excellent condition.

Of course, K.L.G. Plugs and Smith instruments were used throughout the flight, and behaved—well, as they always do!

And After.

The Council of the Institute of Transport has decided to confer its Aviation Gold Medal (the donors of which are Sir Henry White-Smith and the Bristol Aeroplane Co., Ltd.) upon Sir Alan Cobham, in recognition of his services to the development of Empire air communications. The presentation will take place in the lecture theatre of the Institution of Electrical Engineers, Victoria Embankment, W.C. 2, at 5.30 p.m. on October 19.

The school children of London will have an opportunity, thanks to the action of the *Daily Mail,* of hearing Sir Alan Cobham tell the story of his great flight. The Royal Albert Hall has been secured for this purpose, and the lecture will take place, at 2.30 p.m., on October 16. (Applications and particulars may be obtained from "Sir Alan Cobham Lecture, *Daily Mail,* Carmelite House, E.C. 4.")

Sir Alan Cobham will also give a lecture in the Royal Albert Hall, at 8.30 p.m., on October 10.

Today (October 7) Sir Alan Cobham attends a civic reception at Manchester, and is flying there from London in a D.H. "Moth."

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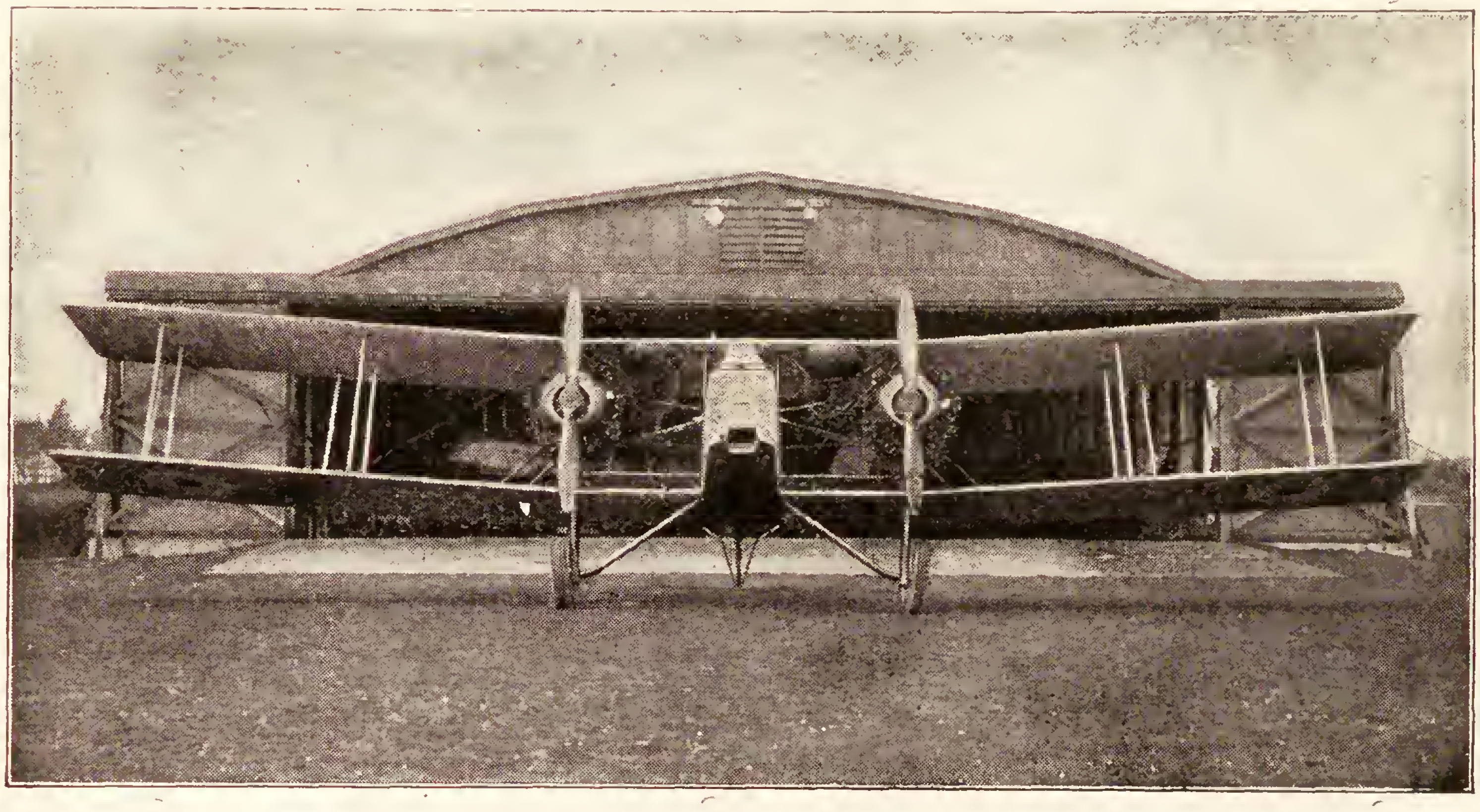

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King's Cup

won by De Havilland (Moth) 27/60 h.p. "Cirrus" engine, piloted by Capt. H. S. Broad, entered by Sir Charles Wakefield, Bart. Won on *PRATTS*.

President's Cup

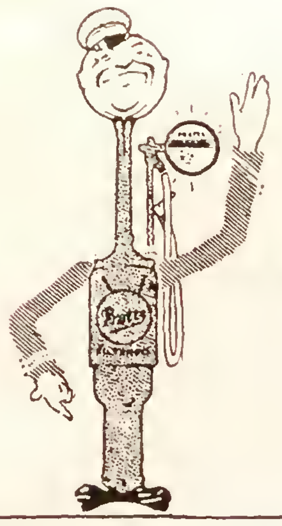
Inter-Club Members' Scratch Race and Bomb-Dropping event, at the Newcastle Aero Club's Meeting—all won on *PRATTS*.

York Aero Challenge Cup

won at the Leeds Aerial Pageant by Mr. J. Parkinson, flying a D.H. Moth (27/60 h.p. Cirrus engine), entered in Pilot Instructors' Race—on *PRATTS*.

Inter Club Team Race

at the Lancashire Air Pageant won by the Newcastle Aero Club—on *PRATTS*.



AND LAND

BOTH INTERNATIONAL TROPHIES, also 72 GOLD MEDALS OUT OF 74, in the International Trials (1926), *won on Pratts*.

ON WATER

ALL 10 FIRSTS at the British Motor Boat Club Meeting, LOWESTOFT, *won on Pratts*.

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DUKE OF YORK'S TROPHY (1926), *won on Pratts*.

Pratts

SIR CHARLES WAKEFIELD WELCOMES ALAN COBHAM

It was a huge assembly of guests—fully 600—which foregathered at the Connaught Rooms for luncheon on Monday last at the bidding of Sir Charles Wakefield, who occupied the chair, to give a public welcome to Alan J. Cobham, A.F.C., upon his splendid flight to Australia and back. Mrs. Cobham, who was on Sir Charles' left, to join in the honours accorded to her husband, was later presented by Sir Charles with a diamond and sapphire "wing" brooch as a memento of the epoch-making flight. Sergeant Ward and Mr. Capel, the two mechanics, were also to the fore at the top table and shared in the ovation which was accorded their leader.

Following the loyal toasts, the Chairman asked the company to drink a silent toast "To the memory of all those pioneers and pilots who have given their lives to the cause of aviation, and especially Arthur Buller Elliott, who died July 6, 1926."

Sir Charles then, as a preliminary to the toast of Mr. Cobham, read portions of a letter from Sir Samuel Hoare regretting that, owing to short notice, he could not be present at the luncheon, and saying :—"Mr Cobham has added another, and the greatest, achievement to his long and distinguished flying record, and has won another battle against the chief enemy of Empire communications—distance.

He followed this with Mr. S. M. Bruce's (the Prime Minister of Australia) letter, which Mr Cobham brought by air, in which Mr. Bruce said :—"I am sure that Mr. Cobham's epoch-making flight will further the cause of aviation very considerably in this country"; and another from the Lord Mayor of Melbourne (Sir W. Brunton), in which he said :—"It was with extreme pleasure that I received from Mr. Alan Cobham on his arrival in Melbourne, the letter which you had entrusted to him to be carried by Imperial Air Mail, and am replying to yours by Mr. Cobham per Imperial Air Mail on his return flight to London. His arrival here was greeted with unprecedented interest and enthusiasm. His visit will, I feel certain, have a stimulating influence in arousing interest in civil aviation and promote that much desired intercourse of trade within the Empire by mapping out and surveying trade routes between Great Britain and the outposts of the British Empire.

"I greatly appreciate your reference of what has been accomplished by Australians in aviation.

"Mr. Cobham, during his short stay in Melbourne, has been most cordially welcomed wherever he has visited. He is a British gentleman whom it was a great pleasure to meet, and I had the opportunity of tending to him, as the Lord Mayor of Melbourne, a civic reception where he had an opportunity of meeting members of our Council and other representative citizens. My sincere wish is that he may arrive safely in his homeland and his mission be highly successful."

Proposing the health of Mr. Cobham, the Chairman thanked Sir Samuel Hoare and the Air Council for their generosity in suggesting that he should be responsible for the first public function to welcome Mr. Cobham.

Mr. Cobham, he said, would probably in a moment be gracefully declining the crown which they offered him. He would tell them that more heroism was demanded in crossing Piccadilly Circus at noon or braving the terrors of suburban travel at the rush hours, but they would have none of such modest disclaimers! Now that the flight had been brought to a triumphant conclusion, they must be permitted to express their heartfelt congratulations. Only a prince of pilots could have planned the journey and carried it through with such truly British coolness and daring.

After a touching reference to the sad death of Mr. Elliott, Sir Charles said that, for British people, the critical and creative phase was that still to come, for which the practical survey flights of Mr. Cobham were such an invaluable foundation. Long-distance flights, forming intangible aerial links between the farthest places of the Empire and its great heart, London : these were the great logical end of air mastery for us. In its immediate Imperial value, the question of the effective establishment of long-distance services was of paramount importance. Whilst he believed that Imperial air services would eventually establish themselves upon a commercial basis, the preliminary stage called for Imperial support. Such support would be the outcome of conferences of Imperial statesmen, and opinion in the country was ripe for any courageous step that would give us the nucleus of such an organised service. We were fortunate in having men of power and ability in charge of affairs at the Air Ministry who would not be slow to take advantage of the present favourable situation. Today they had as their chief guest of honour the man who had done at least as much as any single person could do to hasten the coming of the age of air travel. In matters of organisation, a genius ; second to none as a pilot ; in cool daring and bland, imperturbable will-power, his own unique and charming self—Alan Cobham was indeed a Lord of the Air.

They gave a very hearty welcome also to Sergeant Ward and to Mr. Capel, who were Mr. Cobham's companions for the latter part of the eventful journey.

He was proud indeed to have had his name associated with this wonderful flight, which was from first to last a personal triumph for Mr. Cobham and would have a unique place in the history of Imperial aviation.

Mr. Cobham, who was received with an ovation upon rising to respond, said that this reception was rather bewildering. It had been his desire for years to make this flight, but he knew that he would have to carry out the Cape flight successfully before he could hope to command the support for the bigger enterprise. Even then it was no easy matter to organise the necessary assistance, and in the end he had to come back to his old friend, Sir Charles Wakefield, who believed in this flight, first because he was interested in aviation, and mainly because he had realised the value of aviation to the British Empire. In a brief survey of the flight he made touching reference to Arthur Elliott, whom he described as a model of what an aviation engineer should be, adding that aviation made more exacting calls upon the qualities of reliability and courage than possibly any other branch of engineering. "After the tragedy at Basra I felt like giving up the job altogether," he said, "but I had so many kind telegrams of encouragement, from Sir Samuel Hoare, from Sir Sefton Brancker, and especially from my wife, that I felt I must go on in spite of my depression."

Thanking the R.A.F. for their great help in the flight, Mr. Cobham said that Sergeant Ward in the first few days quickly proved his worth. Subsequently he and Sergeant Ward had many anxious moments together, sitting up watching the great seas, which could not be left, owing to breakers. Referring to his landing on an uninhabited island, he caused amusement by describing the shattering of his boyhood's romantic illusion of what an uninhabited island in the tropics might be. "A more dismal show I never met in my life," he said.

A high tribute to Elliott followed, and Mr. Cobham said that aviation engineers were playing as great a part in the success of British aviation as the pilots.

Describing the effect of these long flights, he said that there was a marked difference in the attitude of people as he passed through to Burma for the second time. They were willing to believe in aviation and were anxious to know more about its possibilities. Then, when he reached Australia he found most ready help from everyone. The Australian Government had sent Col. Brinsmead, the Director of Civil Aviation, from Melbourne to Port Darwin to meet him, and when he told them that Col. Brinsmead had had to fly a distance approximately from here to Constantinople, they would realise how much interest they took in the flight in Australia. After referring to the leading incidents and lessons of the flight, Mr. Cobham emphasised that 90 per cent. of the flight to Australia and back was done under British organisation. In fact, it was impossible to fly across the world without the aid of British organisation, and he thought aviation more than anything else was bringing home to the British people what the British Empire really was to the world. Australia was so vast that it had been held back by its vastness, but aviation was now coming to its aid, and isolated farmers in the interior were no longer shut off from their fellow-men. Too much emphasis was generally laid on the question whether an air route would pay ; it should be looked upon as a means of opening up a country, and its success judged by the general development which followed.

"My only hope," he continued, "is that the interest that has been aroused in aviation throughout the British Isles is permanent." The whole flight was to demonstrate the practicability of aviation. "We wanted to prove that flying is an everyday affair. Everyone can learn to fly." Flying was going to bring home to the British people what the British Empire really was. It was going to give to the people of these islands a new recreation, a new life. They would learn to see the beauties of their own country under an entirely new aspect.

Lord Thomson, submitting the toast of "Imperial Communications," said that he regarded air routes as the arteries and veins of the British Empire. They would create a new spirit or revive an old spirit, which, perhaps, was drooping—a spirit of unity, a conception of our destiny as a race, and our mission in the future. He was of the opinion that if they had an air route half-way round the world the aircraft industry in Great Britain would be one of the most flourishing of our industries.

Air Vice-Marshal Sir Sefton Brancker, responding, remarked that he believed air transport was going to help the world in general, and the British Empire in particular. It still had its teething troubles. " Sometimes it is irregular. In some hands it is unsafe, but I am glad to say not in British hands," added Sir Sefton. " We have been a nation of seamen ; we can and must be a nation of airmen."

Viscount Novar, a former Governor-General of Australia, proposed " Our Overseas Dominions," and said that Mr. Cobham by his flight had given them a new outlook on the relation of the Dominions to the Mother country. Australia was a land in which aviation had unlimited possibilities, and no greater service could be done to the Empire than to " speed up " communication between the Dominions and the mother-country.

Maj.-Gen. Sir Neville Howse, V.C., the Minister for Defence for Australia, and Mr. J. G. Latham, Attorney-General, responded to the toast, the latter emphasising how speedy communications would further the knitting together of the Empire on the basis of self-government for each Dominion.

Lord Riddell and Lord Dewar responded for " The Guests," and the toast of " The Chairman " was honoured on the proposal of the Spanish Ambassador, who referred to the work of the Royal Air Force in finding the Spanish airmen lost in the desert as an instance of how aviation helped to bind two nations together.

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"TO MEET MR. ALAN J. COBHAM, A.F.C."

Thus ran the heading of the official invitation of The Air Council to those who were bidden to the luncheon at the Carlton Hotel, on Tuesday last, presided over by Sir Samuel Hoare, Secretary of State for Air, when later Sir Samuel made the announcement of the decision of His Majesty to confer upon Mr. Cobham the honour of Knight Commander of the British Empire, in recognition of the good work done by Mr. Cobham. Some 70 guests attended, in addition to Mr. and Mrs. Cobham, Sergeant Ward, and Mr. C. S. Capel.

Following the luncheon, Sir Samuel Hoare, in proposing the toast of " Our Guest," in which he included the names of Sergeant Ward and Mr. Capel, said he hoped their guest would remember this luncheon as being unique. It was seldom that the British Government offered hospitality to a British subject, whatever it might do to foreign notabilities, and moreover, it was the first time on record that a lady had been so entertained, or rather two ladies, for Lady Cobham desired to have with her a companion of her own sex in the den of lions or of Daniels, from whichever point of view one regarded it. He wished to express the appreciation of the Air Council of the flight which was a very great event, and one likely to be a milestone in the history of aviation, it being the more worthy, inasmuch as it was entirely backed by private assistance, a good omen, as it would be best for aviation not to be solely a Government affair. He wished to welcome Mr. Cobham, and was glad to think it was brought about by private enterprise, and he especially welcomed such help as given by Sir Charles Wakefield.

There were two main reasons why the Air Ministry attached great importance to this flight. Firstly, for the sake of Civil aviation, by means of which rapid communication would be developed between one part of the Empire and another. Mr. Cobham had by his work, given a conspicuous example of how this should be entered upon ; viz., by bringing London within a fortnight of the various parts of our vast Empire. Secondly, there was the military reason. He must have been able to impress that lesson more directly than ever done before, upon millions of citizens who gathered together under the most varied climes and conditions during the flight. He had made flight a veritable landmark throughout his journey, and demonstrated the immense mobility of the aeroplane. This time, a seaplane—although by being able to adapt it with wheels for duty as a land machine, he had pointed the way to a solution of the most economic method of communication between the outlying points of the Empire. By changing the under-carriage from wheels to floats or from floats to wheels, such a machine could be equally available for flying for thousands of miles by land or sea. If they could so organise their air power as to move it easily from one part of the Empire to the other, over land and sea, they might find a way of making the Empire's defences more economical and efficient. The King had, Sir Samuel continued, taken the greatest personal interest in this flight, and he (Sir Samuel) was pleased to say he had been entrusted to make the first announcement of His Majesty's decision that the King had been graciously pleased to appoint Mr. Alan Cobham a Knight Commander of the British Empire, to decorate Sergeant Ward with the A.F. Medal, and confer Membership of the Order of the British Empire upon Mr. Capel. which announcement was received with vociferous applause.

Mr. L. S. Amery, M.P., Secretary for Dominion Affairs, supported the toast, and expressed his congratulations to Sir Alan, " an Apostle of Empire development," and Lady Cobham, upon the conclusion of what had been a great organisation of skill and endurance. A new chapter in the history of aviation had been opened, in which one single aeroplane and engine had achieved one long-distance flight after another. Further, the new chapter which was opening in the development of the British Empire, meant remedying our present means of communication, which were far too slow to get the leading men of the Empire together for taking counsel, if only once a year. The bringing together of those men for personal consultation could not be compared with any other form of intercommunication. The Empire existed by virtue of its communications ; it was the outcome of sea communications, and would always depend on sea communications and sea power for its defence and existence, but it would also depend in an ever-increasing measure on every form of communication which could bring its scattered parts more closely together. And towards that end, Sir Alan had blazed the trail, and what he had done had a far greater influence upon what a united Empire can do than many thousands of speeches.

Lord Birkenhead, Secretary for India, who also supported, opened in a characteristically humorous vein, and continuing, said it was the occasion of high romance comparable with the days of Elizabethan daring and chivalry, with its reward. They would remember how the acolade of knighthood was conferred on Sir Francis Drake when he landed after a memorable voyage, and the announcement which the Secretary of State had made in regard to Mr. Cobham compared with that supreme and interesting moment. When they compared the achievements of the Elizabethan navigators and pirates—great as they were, with those they were celebrating that day they were not conscious of an inferiority. They paid tribute to a man who had shown as great endurance and courage as any of the great pioneers of the past. It was easy for us at home to congratulate Sir Alan, but he would hardly forget the many hazards and trying times that he had encountered and gone through.

The achievement of the great flight was of the greatest importance to India, with its population of 300,000,000. Two hundred years ago it took seven months to reach India —seven months to send a message and seven months for a reply—and by that time the thing had happened. The position of the Governor of the Company was comparatively easy and everything worked for the best. Now all these new-fangled and ill-conceived things disturbed the tranquillity of the Minister. They were very tiresome. While they realised that these things were very embarrassing to those responsible, they must pay high tribute to a man who had shown as great a degree of courage as had been shown by any of the great pioneers of the past. He very much hoped that Lady Cobham would persuade her husband that there was a period when active flight might be abandoned to younger men. Sir Alan had played his part, and it might be that his future would be equally invaluable in the instruction of younger pilots.

They should not forget those who designed the marvellous machines which enabled this triumph to be achieved. The Armstrong-Siddeley " Jaguar " engine, which had functioned so marvellously, alone was a triumph for this country. Finally, he congratulated Sir Alan upon the well deserved honour which had been conferred upon him. He felt he would be an honour to the Order.

Sir Alan Cobham, in responding, said he felt overwhelmed by the honour done him. He was afraid he did not agree with Lord

Birkenhead, as he hoped to go on at flying until he was too old to be lifted into a machine. As to the flight, it was undertaken to achieve a real object and to kill "stunting" and to bring home to the people that flying had a practical issue, and incidentally to launch a certain amount of Imperial propaganda and to bring back a report that would be useful to the Air Ministry. Nothing theatrical was intended, but just to accomplish what they set out to do. Sir Alan paid a high tribute to Sergeant Ward who undertook at a moment's notice, the position when Elliott had been taken from him. He spoke feelingly, when at Karachi, of the willing co-operation and help of the Air Force; one and all were personally interested in his flight, and did not hesitate at whatever they were called upon to do.

It demonstrated the freemasonry of the air which existed. Had he not converted the machine into a seaplane he could not have accomplished the flight from India to Australia except with an extreme element of luck. "And I don't believe in luck," added Sir Alan. On five occasions they had trouble which they overcame in a seaplane, but he doubted if they could have done so in an aeroplane. In Australia conditions were ideal for flying, and many difficulties there could be banished by the adoption of flying.

Although it meant overloading, from Melbourne he decided to carry Mr. Capel back with them, as it meant he must have a "spare hand" to help them through, and in spite of that overloading, the Jaguar rose to it, and they came back absolutely in O.K. condition. He thought that there were not many more of this type of flight to be done. Now we wanted to get down to the regular air routes. Not to regard them at first as a commercial proposition but as an Imperial asset in opening up the country in our various possessions, and this would repay the Empire a thousandfold for any outlay with its fast mails and other advantages; whilst it would also serve as feeders to the great steamship lines. With the termination of this flight he felt he had stimulated great interest in the future.

Amongst others present were: Lady Maud Hoare, the Earl of Birkenhead, the Rt. Hon. L. S. Amery, M.P., the High Commissioner for Australia, the High Commissioner for New Zealand, Sir Charles Wakefield, Bart., Brig.-General the Lord Thomson, Major the Earl Winterton, M.P., Lord Southborough, Sir Walter F. Nicholson, the Agent-General for Western Australia, the Agent-General for Victoria, Lord Stanley of Alderley, the Agent-General for South Australia, Sir Francis McClean, Sir Sigmund Dannreuther. Sir Samuel Instone, Sir Harry Brittain, M.P., Capt. H. E. P. D. Acland, Air Vice-Marshal Sir V. Vyvyan, Air Vice-Marshal Sir W. G. H. Salmond, Lord Montague of Beaulieu, Lieut.-Colonel J. T. C. Moore-Brabazon, M.P., Air Vice-Marshal Sir W. Sefton Brancker, the Agent-General for Queensland, Prof. Sir Richard Glazebrook, the Agent-General for Tasmania, Sir Herbert Hambling, Bart., Capt. Geoffrey de Havilland, Sir George Beharrell, Sir Geoffrey Butler, M.P., Capt. the Viscount Curzon, M.P., Commander H. E. Perrin, Major Woods-Humphery, Capt. W. Brass, M.P., Rear-Admiral M. F. Sueter, M.P., Major J. Evelyn Wrench, Brig.-General F. H. Williamson, Colonel Barrett-Leonard, Major R. G. Casey, Messrs. H. T. Vane, O. V. G. Hoare, E. E. Beare, Philip Foster, F. Handley Page, Geoffrey Lloyd, Stanley Spooner, H. Scott-Paine, A. V. Roe, C. R. Fairey, Basil Johnson, S. D. Siddeley, W. Newton, P. G. Bailey, Wareham Smith, J. E. Saunders, Oswald Short, G. Holt-Thomas.

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THE YORKSHIRE AIR PAGEANT

THE Yorkshire Aeroplane Club held the second of its aerial pageants at Sherburn-in-Elmet on Saturday last. Although the finish of the England-Australia-England flight on the previous day prevented several well-known pilots, who had promised to come along to Sherburn, from being present, there was a remarkably good attendance of spectators—there were nearly 1,000 cars and motor-cycles parked there alone—and a good programme of events was successfully got through.

Among those present was Air Vice-Marshal Sir Sefton Brancker, who had travelled up to Leeds by train on Friday night, immediately after greeting Sir—then Mr.—Alan Cobham.

In an interview Sir Sefton Brancker expressed great satisfaction with the progress that has been made in civil aviation during the past few months, particularly by the light aeroplane clubs such as those of Yorkshire, Newcastle, London, and Lancashire, who competed in the various races on Saturday. The Yorkshire Aeroplane Club, he said, had one of the finest aerodromes in the country. As a mark of his interest and gratification at the progress the club has made, Sir Sefton Brancker urged that they should hold another pageant next year on a bigger scale and promised that he would endeavour to secure the presence of many of the leading pilots of the country.

Of the visitor-competitors there were present Mrs. Elliott Lynn; Mr. Dudley Watt, who flew his "Swallow" monoplane and Sopwith "Grasshopper"; Wing-Comdr. Harold Blackburn (Officer Commanding the Martlesham aerodrome); Mr. Lowton of the North Sea Aerial and General Transport Company's flying school at Brough; Sq.-Leader Longton, on the Blackburn "Bluebird"; and the Lancashire and Newcastle clubs were also represented.

Mrs. Eliott Lynn, whilst on her way to Sherburn, had the misfortune to crash her D.H. "Moth," KT, fortunately without injury to herself or passenger and with only minor damage to the machine. In the actual competitions, therefore, KT was absent but Mrs. Eliott Lynn flew an S.E.5 instead. During the afternoon Sq.-Ldr. Longton gave an exhibition of crazy flying on the "Bluebird," which was much appreciated.

The afternoon commenced with a parade of machines and fly past, after which the machines lined up for an inter-club race for members trained throughout by light aeroplane clubs. This event provided a thrilling finish, the winner being Dr. H. B. Dixon (Newcastle), Mr. M. B. Lax (Yorkshire) losing first place only by a fraction of a second.

The results of the various events were as follows:—

Inter-Club Members' Handicap Race to Selby and back.—H. B. Dixon (Newcastle); 2, M. B. Lax (Yorkshire); 3, D. H. Thompson (Newcastle).

Open Handicap Race, 25-mile course round Selby and Tadcaster.—Sq.-Ldr. Longton (Blackburn "Bluebird"), scratch, time, 17 mins. 21 secs.; 2, Mrs. S. C. Eliott Lynn (S.E. 5), 5 mins. 24 secs., time, 18 mins. 38 secs.; 3, Dudley Watt (Sopwith "Swallow"), 5 mins. 12 secs., time, 18 mins. 49 secs.; 4, Captain A. M. West (D.H. "Moth").

Message Dropping Competition (15 points for a bull, 10 for an inner, and 5 for an outer).—Yorkshire (30 points); 2, Newcastle (15); 3, Lancashire (10).

Gladstone Trophy, machines to climb 2,000 ft., then glide down with engine throttled and land near a given mark (seven entrants).—Dr. H. B. Dixon (Newcastle).

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Across Canada in a Seaplane

A REMARKABLE flight across Canada in a seaplane from Montreal to Vancouver has just been accomplished. The machine, a Douglas biplane similar to the world-flight type, was owned by an American civilian, who was piloted by Sq.-Ldr. Earl Godfrey, Royal Canadian Air Force. They left Montreal on September 11 and, flying via Ontario, Sudbury, Lac du Bonnet, Prince Albert, Wabamun Lake, and Yellowhead Pass, they arrived at Vancouver on September 19. The total distance covered was about 3,000 miles, 700 of which, from Yellowhead Pass, was over mountains.

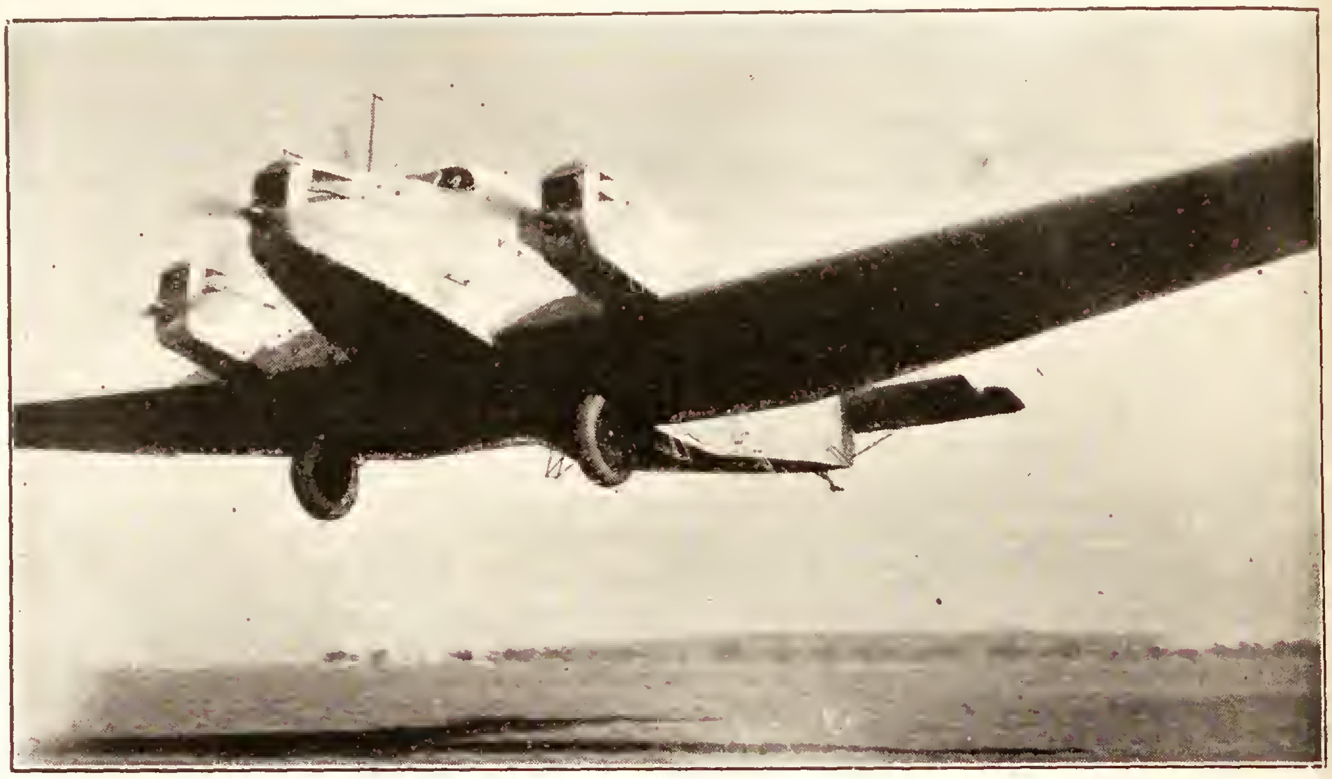
Royal Air Force Flying Accidents

THE Air Ministry regrets to announce that, as the result of an accident near Lahore, India, to a Bristol Fighter of No. 31 Squadron, on September 14, Pilot Officer Dick Culverwell Sherman, the pilot, and sole occupant of the aircraft was killed.

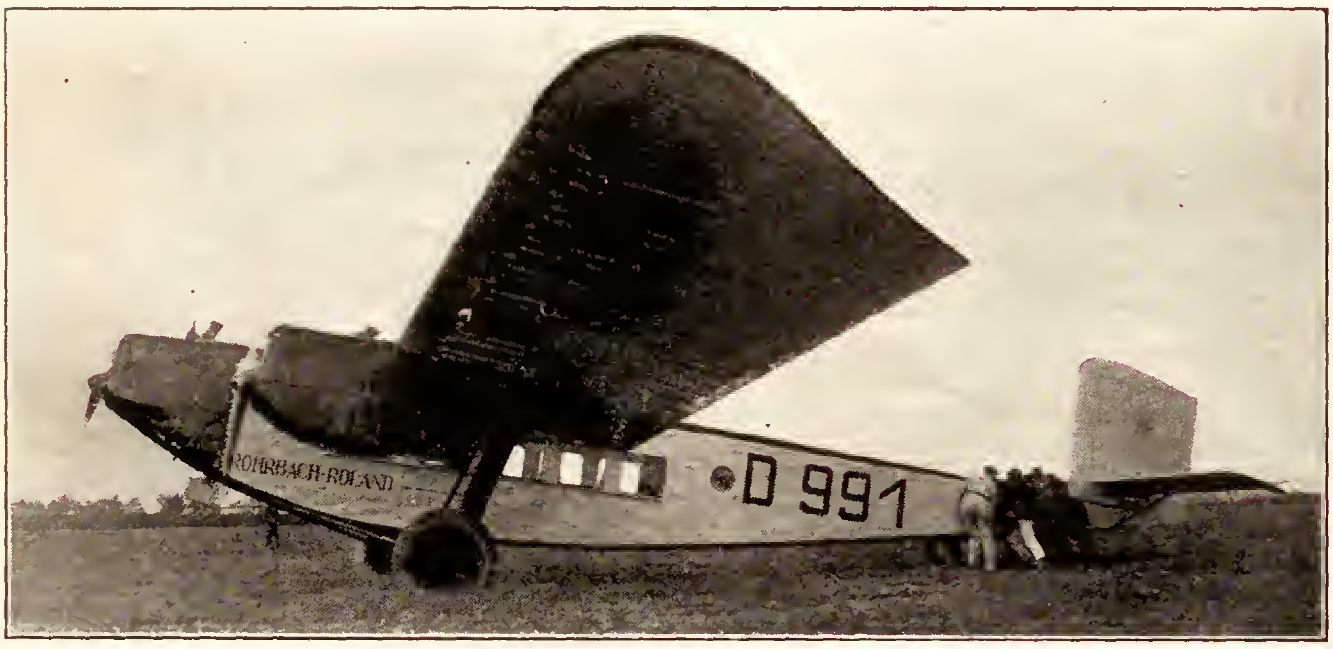
As the result of an accident at Biggin Hill, Kent, to a Grebe of No. 56 Squadron, Biggin Hill, on September 20, Flying Officer Henry Frederick Luxmoore, the pilot and sole occupant of the aircraft was killed.

As the result of a flying accident on September 22, at Attock, India, in which a Bristol Fighter of No. 5 Squadron sank in the River Indus, No. 344719, A.C.1. Percy Jones, the passenger in the aircraft, is presumed to have been drowned. Flying Officer Denniss Robinson, the pilot, sustained only slight injuries and reached the bank of the river safely.

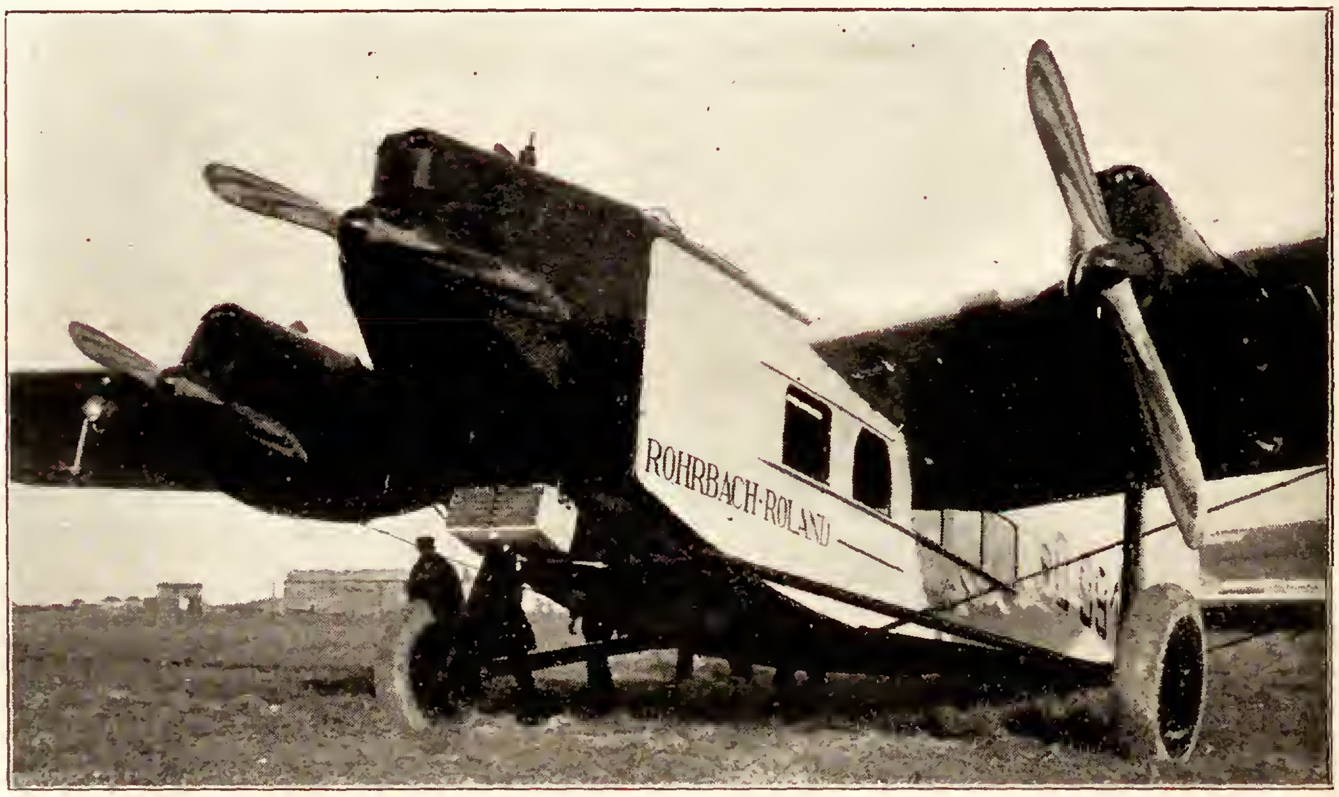
MODERN GERMAN 3-ENGINED MACHINES



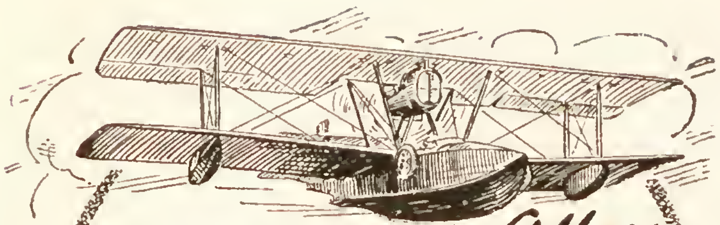
The latest Junkers Monoplane G31: Although Germany has been released from the restrictions imposed by the Allies for but a very short time, the Junkers Works of Dessau have already completed a new machine of some 100 sq. m. (1,076 sq. ft.) wing area. The width of the fuselage is in the neighbourhood of 10 ft., and below the floor of the saloon is a large space for luggage and goods. The three engines are Junkers, developing a total of more than 1,000 h.p.



The Rohrbach "Roland": At the moment, when it is rumoured that the Beardmore works at Dalmuir have under construction a large three-engined monoplane, this photograph of the Rohrbach "Roland" is of interest. It would appear that in this machine also Dr. Rohrbach has "practised what he preaches" concerning high wing loading. Needless to say, the machine is of all-metal construction.



The Rohrbach "Roland": Close-up view showing the three engines, the undercarriage, &c. Note the single "funk-wire" on each side. The engines are carefully disguised, but are obviously 6-cylinder verticals. The saloon has accommodation for ten passengers.



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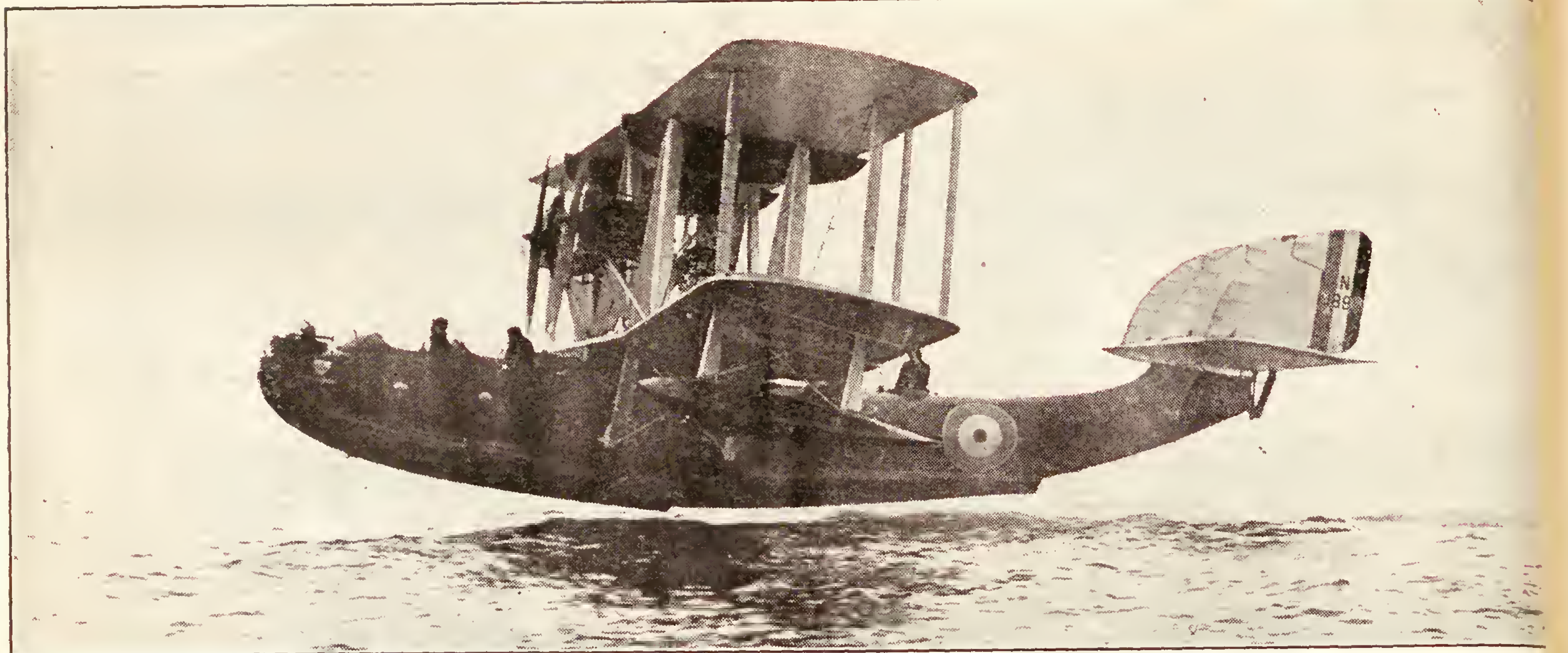

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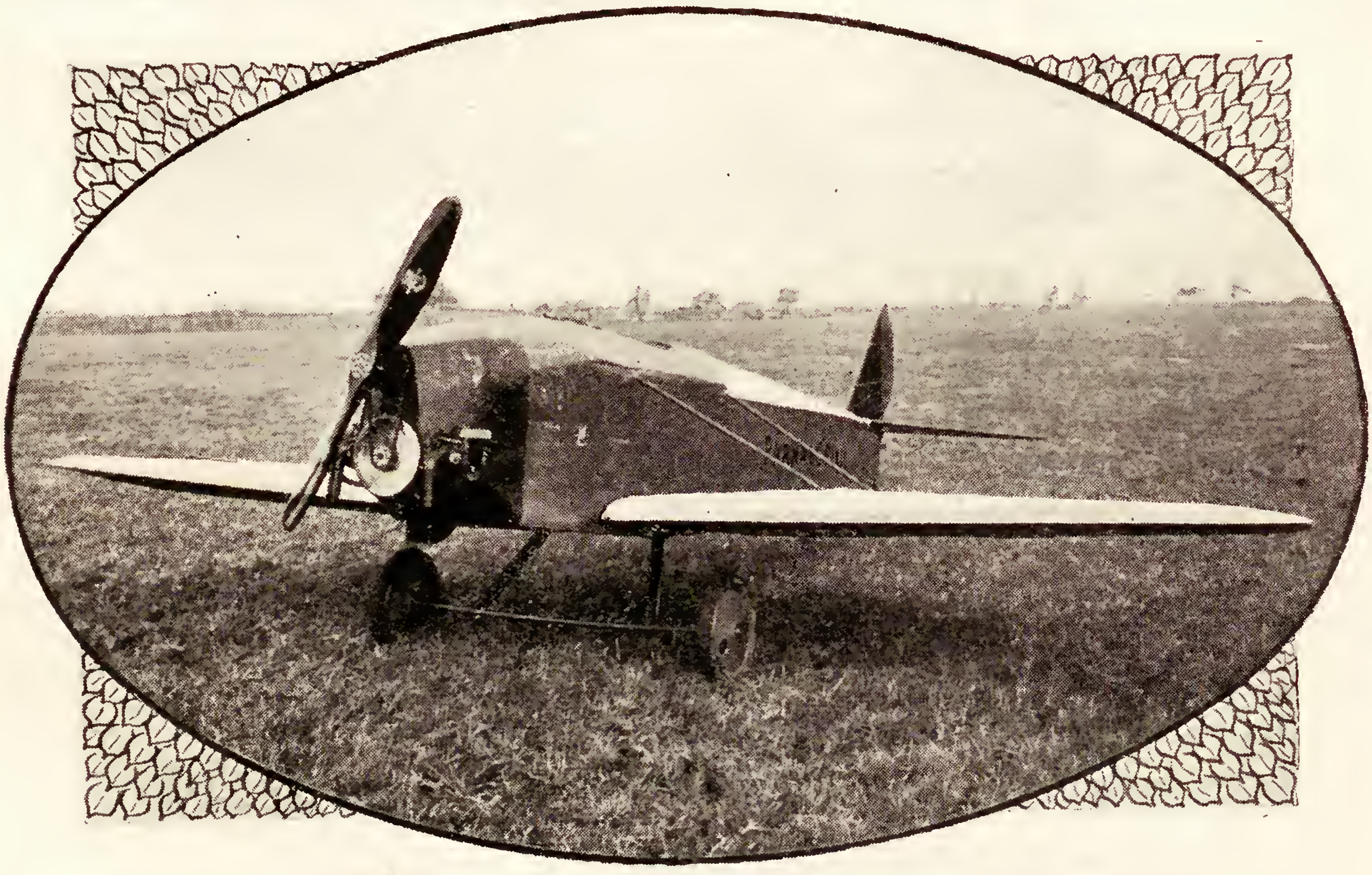

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INSTITUTE OF AERONAUTICAL ENGINEERS

The following is the fixture list for 1926-1927 of the Institution of Aeronautical Engineers:—

1926.

October 12, Tuesday.—Paper by Mr. M. L. Bramson, A.C.G.I. (Member), on "Unsolved Aeronautical Problems."

October 26, Tuesday.—To be arranged.

November 16, Tuesday.—Paper by Mr. A. G. von Baumhauer, Sub-Director of the Government Aeronautical Laboratories, Amsterdam: "Some Notes on the Possibilities of Progress in Aviation."

November 30, Tuesday.—Paper by Mr. F. S. Barton, M.A., F.Inst.P., on "Air Photography Apparatus."

December 9, Thursday.—Paper by Captain F. Entwistle, B.Sc., on "Wind Structure in Relation to Air Navigation."

1927.

January 13, Thursday.—Paper by Professor F. C. Lea, D.Sc., M.Inst. C.E., M.I.Mech.E., on "Some Experiments on the Effects of Repeated Stresses on Materials."

January 25, Tuesday.—Paper by Mr. F. S. Barnwell, B.Sc., O.B.E., A.F.C., F.R.Ae.S. (Honours Member): "Some Notes on the Design of Airscrews."

February 10, Thursday.—Paper by Mr. H. P. Folland, F.R.Ae.S., M.B.E. (Honours Member). Title to be announced later.

February 22, Tuesday.—Paper by Lieut.-Colonel L. F. R. Fell, D.S.O., O.B.E., R.A.F., on "The Manufacture and Testing of Mechanical Units for Aircraft."

March 8, Tuesday.—Paper by Major H. N. Wyllie, B.Sc., F.R.Ae.S., on "Portable Hangars."

March 16, Wednesday.—Visit to the Factory of Messrs. A. D. C. Aircraft, Limited, Waddon.

March 22, Tuesday.—Paper by Mr. W. Villa Gilbert, Founder M.R.Ae.S. (Member and Honorary Secretary), on a New Type of Wing Construction.

April 6, Wednesday.—Visit to the Works of Messrs. The DeHavilland Aircraft Co., Ltd., Stag Lane Aerodrome, Edgware, Middlesex.

April 19, Tuesday.—Paper by Capt. F. Tymms, M.C., on "Flying for Air Survey Photography."

May 10, Tuesday.—Paper by Mr. Lawrence A. Wingfield, M.C., D.F.C. (Associate), on "Aircraft Law."

May 25, Wednesday.—Visit to the National Physical Laboratory, Teddington, Middlesex.

June 4, Saturday.—Visit to Croydon Aerodrome, by courtesy of Messrs. Imperial Airways, Limited.

Note.—All the lectures will be held in the Lecture Room of the Junior Institution of Engineers, 39, Victoria Street, London, S.W.1, at 6.30 p.m.

UNSOLVED AERONAUTICAL PROBLEMS

In spite of the great strides that have been made of recent years in the development of the science and art of aviation, we are still a long way from being able to claim that our knowledge of the subject is within measurable distance of being in the nature of an exact science. Nor can we say with any certainty whither aviation as we know it today is likely to lead us. To those whose daily task it is to carry out aerodynamic estimates, structure calculations, planning and placing of equipment, and the thousand and one things which go to the production of a modern aeroplane, and who may, therefore, be somewhat apt to come to look upon the aeroplane as we know it today as something very like final, and the problems connected with it capable of being tackled in a routine fashion, to them, we think, an occasional change of viewpoint may be of very considerable assistance, and may open the way for new ideas, or for new ways of attacking old problems.

Such a change of viewpoint is represented by the paper to be read by Mr. M. L. Bramson, A.C.S.I., before the Institution of Aeronautical Engineers on October 12, the title of which is "Unsolved Aeronautical Problems." Mr. Bramson does not merely look at the aeroplane as we know it today and then speculate upon how, by certain minor refinements, we may slightly improve the performance, or the economy, or the cost, or the safety. He boldly makes up a long list of problems which as yet remain unsolved, many of which will probably be thought to lie rather a long way out in the future. That, however, is, to our way of thinking, one of the chief merits of the paper; instead of marvelling at what we have already accomplished, the lecturer takes the opposite course and outlines some big problems that still have to be tackled. It should be understood that he does not attempt to solve the problems, preferring, presumably, to leave it to the discussion to bring forth suggestions for the solution of the various riddles.

Among the many problems which Mr. Bramson proposes to deal may be mentioned the following: The propulsion of aeroplanes with constant power at varying altitudes; jet propulsion; variable wing surfaces; vertical ascent and descent; fog landing; seaworthy flying boats; the ideal aerodynamic structure; the multi-engine room with ideal propeller distribution and without engine drag; the super-altitude high-speed transatlantic liner, etc.

It will be seen that there should be sufficient material for a discussion lasting several weeks, and the paper should afford an excellent opportunity for people with new ideas to put them forward, even if one evening will scarcely suffice to "solve" all the problems. However, there is always a great advantage in knowing what one is "up against," and a realisation of the exact nature of an obstacle will often help one in surmounting—or perhaps circumventing—it.

Mr. Bramson will read his paper in the lecture room of the Junior Institution of Engineers, 39, Victoria Street, S.W.1, at 6.30 p.m., on Tuesday, October 12, and we understand that non-members of the I.Ae.E. will be welcomed, and may obtain tickets from the Hon. Secretary, Institution of Aeronautical Engineers, 34, Broadway, Westminster, London, S.W.1.

◆ ◆ ◆ ◆

Land's End to John O'Groats Flight

Col. the Master of Sempill, flying a D.H. "Moth," left the village of Sennen—within a mile of Land's End—on September 29, and flew to John O'Groats, with only a brief halt at Shotwick, Chester, in 8 hrs. 14 mins. The distance covered was about 630 miles. He started on the return journey on September 30, but just as he got away he experienced engine trouble and had to make a forced landing. In doing so he struck a rough pitch of ground, and the "Moth" turned turtle, but fortunately he escaped uninjured, and the machine was only slightly damaged.

Australian Flight to the Pacific

Group-Capt. R. Williams, with Flight-Lieut. McIntyre, Pilot Serg. Trist, and a mechanic, left Melbourne on September 25 in a Supermarine "Seagull" Amphibian (Napier "Lion") on the first stage of the aerial survey of the Pacific Islands. They reached Sydney after a flight of 9½ hours, and left again on September 29 for Brisbane. A broken split-pin, however, necessitated a forced descent in rough sea 6 miles from Southport, Queensland. The flight was resumed on October 5, and they arrived safely at Gladstone.

Another Cross-Channel Air Service Disaster

A terrible disaster, following much too close upon that of August 18 last, overtook one of the French Air Union four-engined Bleriot air liners on October 2 in the vicinity of Tonbridge, Kent, in which five passengers, the pilot and mechanic lost their lives. The tragedy occurred at about 3.30 p.m. as the machine was flying over Tonbridge *en route* from Paris to London. It was observed that the machine was in difficulty, and then suddenly flames were seen coming from the rear of the machine. The pilot immediately turned as if to land at Penshurst, but the flames rapidly spread over the machine, and a few minutes later the machine slowly turned over, then crashed to the ground, and was immediately a mass of flames. Several people rushed to the spot, but so intense was the heat that it was impossible to render any assistance, and every occupant in the machine perished. At the inquest on the seven victims, which was held on October 5, the jury found that the persons concerned met their deaths accidentally—there being no evidence to show the cause of the fire, while Maj. Cooper, of the Air Ministry, stated that he had arrived at no conclusion at all as to the cause of the affair. Investigations are proceeding.

AIRCRAFT IN COMMERCE AND WAR*

ONE opens a book by the author of "Air Power and War Rights" with expectations of being interested and informed. Mr. Spaight has shown himself a master of the syllogistic style, supporting each step of the argument with instances and authorities, forcing the reader inevitably to a certain conclusion, and withal never allowing himself to become tedious. His latest work is a book of only 97 pages, exclusive of notes, and he explains that it is written, not for the specialist, but for every citizen who takes an intelligent interest in the problem of Imperial defence. It is a book easy to read and it certainly ought to be widely read. None the less, there is much in it which is bound to set the specialist thinking; and to set a specialist thinking outside his own groove is always good work.

The "syllogism" of the book might be set down in its simplest form thus:—

> Aircraft will be extensively used in future wars as commerce destroyers.
>
> Commerce destruction arouses resentment in neutrals, and their resentment embarrasses the belligerent who rules the sea.
>
> Therefore the system of "cartel ships," begun in the Great War, must be put into general use.

It is explained that a cartel ship is one granted a letter of assurance by the belligerent, after due inquiry, to the effect that its cargo is not destined for the enemy and that therefore the ship is immune from search and detention.

It may be thought somewhat unnecessary to have written a book of even 97 pages to elaborate that syllogism. The criticism might also be advanced that the argument applies chiefly to naval forces and only incidentally to aircraft as the "fleet air arm." But, if an excuse for the book is needed, an ample one may be found in the number of pregnant remarks which the author makes in the course of developing his main argument.

For one thing, it is extremely interesting to watch the development of Mr. Spaight's own ideas. In "Air Power and War Rights" he argued that cities, such as the City of London, should only be subject to air bombardment by night. He considered that a reasonable limitation which ought to be accepted as a rule of war; and he argued, and still argues, that rules of war which are reasonable will as a rule be observed by belligerents for their own sakes; while it is worse than useless for a rule of war to forbid too much. In the present volume he appears to have given up all hope of saving cities from air frightfulness. He admits the probability that they will all be plentifully bombed.

One very much regrets that Mr. Spaight should have come to this conclusion. "Air Power and War Rights" really appeared to hold out some prospect of limiting the horrors of war to the combatants, the munition workers, and those who operate communications. But the hope certainly shrinks whenever one talks to an Air Force officer of any rank, and finds that he accepts as a matter of course the policy of "striking at nerve centres"—which is the modern way of saying "frightfulness."

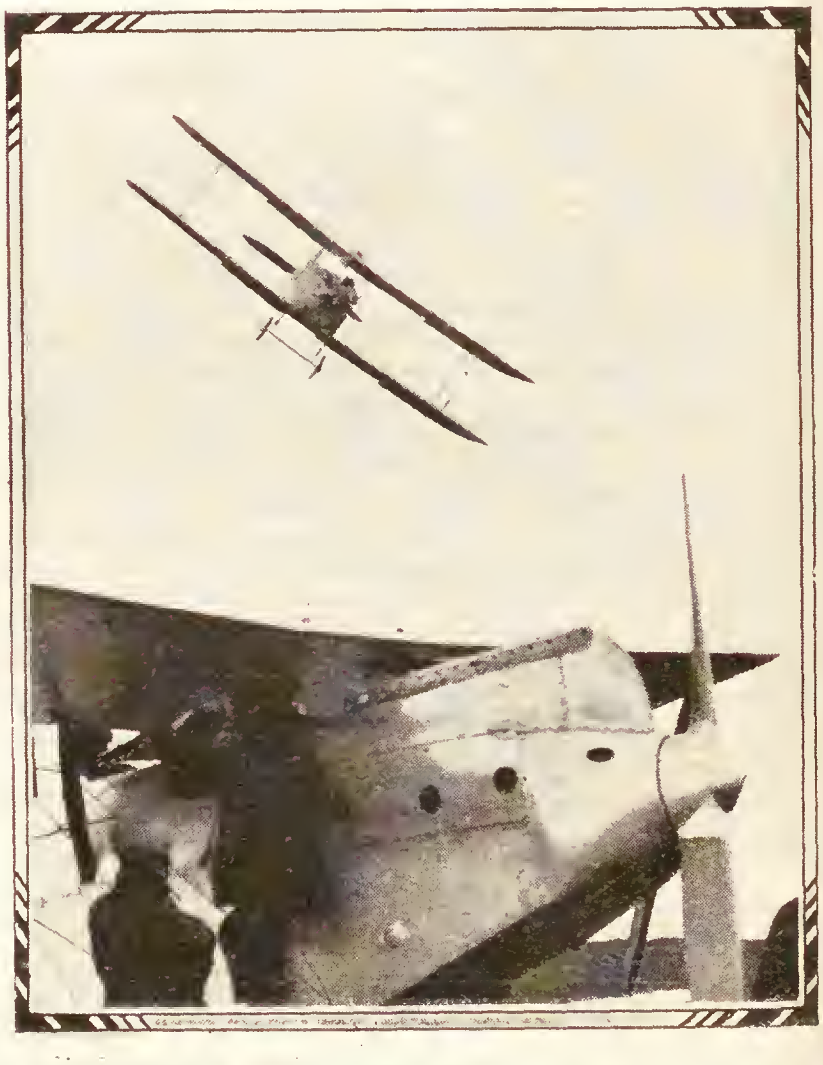
There are certain air enthusiasts—it is best to be polite and call them enthusiasts—who profess to believe that the days of naval power have gone, that they withered at the advent of the aeroplane. Mr. Spaight does not take that point of view, and it will perhaps do the said enthusiasts good to read this book. He pictures aircraft as a very great assistance to sea power and as a great threat to sea power, but not as yet a substitute for it. He considers separately the aircraft of the mistress of the seas which is exerting economic pressure on an enemy, and the aircraft of the enemy which is fighting for its economic life. The case of the latter is simple, and is shown to be practically on all fours with the case of the German submarines in the Great War. These aircraft, like the submarines, will be unable to dispute the naval Power's mastery of the surface of the sea, but will indulge in a policy of sudden raids in the hope of disturbing it to some degree. They will also attempt, as the submarines did, to turn the tables by raiding the commerce of the naval Power, and, *ex hypothesi*, the naval Power must be more dependent on its sea-borne supplies than its opponent can be. Mercy must not be expected in these raids. It was not easy for a submarine to observe the decencies of war, even if it had the will to do so. It will be infinitely harder for aircraft to display anything resembling chivalry. In fact, the hope that such aircraft will show any tendency to humanity may be dismissed.

The aircraft of the naval Power will be in a different position. As the seas will be open to the carriers of that Power, the aircraft will have a great range of action, and it will in various ways enormously increase the ability of the naval Power to exert economic pressure on its adversary. In order not to antagonise neutral opinion, the aircraft of this Power will have to behave with circumspection and pay great regard to accepted rules of war. Mr. Spaight discusses at some length the question of aircraft stopping and visiting vessels, and decides that the cartel system is the only possible solution of the difficulty. The adoption of such a system will relieve this naval air arm of most of its work, except that of identifying the ships notified as having cartels, and taking action against suspicious ships which are not so provided. It will accordingly be able to devote most of its energies to protecting its own shipping from enemy attacks.

Apropos of convoying merchant ships, Mr. Spaight on pp. 36-37 seems to be in strange ignorance of the success of air convoys in the last year or so of the Great War. He writes: "The chief defence will almost certainly be the cruiser or other warship *plus* its deck-borne aeroplane. In addition it may be necessary possibly, to devise some system of air convoy. The idea may seem fantastic now, but so did the suggestion of the need of destroyer convoy before the late war." It is difficult to realise that so careful a student should be ignorant of the successful use of the "Blimps" as escorts of shipping. No merchant ship was ever lost by submarine attack while under aircraft escort, and we may assure Mr. Spaight that the idea of air convoy does not seem in the least fantastic now, and did not appear so to our airship officers in 1918.

F. A. DE V.R.

* * *



A reminiscence of the Lancashire Pageant: Sq.-Ldr. Longton "crazy-flying" on the Blackburn "Bluebird."

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* By J. M. Spaight, author of "Air Power and War Rights," etc., Longmans, Green and Co. Ltd.

THE ROYAL AIR FORCE

London Gazette, October 1, 1926

General Duties Branch

The follg. are granted permanent commissions as Pilot Officers with effect from Sept. 18, 1926, and seniority of Sept. 18, 1925 :—C. S. Cadell, J. H. E. Jones. The follg. are granted short-service commissions as Pilot Officers on probation, with effect from and with seniority of Sept. 18 : G. C. Bainbridge, G. Bartholomew, A. K. K. Calwell, J. F. Duff, F. G. Fairhead, G. P. T. Gibbons, M. Griffiths, H. C. D. Hayter, D. S. King, F. E. L. Reynolds, V. D. Morshead, J. A. Rogers, E. L. J. Rowe, H. H. R. Schleman, C. K. T. Hughes, G. R. Weighill. The follg. are granted temp. commissions as Flying Officers on seconding for four years' duty with R.A.F. (Sept. 18) :—B. F. R. M. Freeman (Lieut., King's Own Royal Regiment), J. W. Thompson (Lieut., R.A.).

The follg. Flying Officers are transferred to Reserve, Class A : H. MacMillan (Sept. 27), B. J. Finn (Sept. 29). Flying Officer (Hon. Flight Lieut.) F. B. Lawrie (Lieut., R.N., retd.) resigns his short service commission (Sept. 30) ; Flying Officer J. A. P. A. Yearsley relinquishes his short-service commission on account of ill health (Sept. 29).

Medical Branch

The follg. Flying Officers are granted permanent commissions in this rank (Sept. 29) :—B. W. Cross, J. MacC. Kilpatrick, M.B.

Chaplains' Branch

The Rev. A. H. Dolphin is granted a short-service commission as a Chaplain with the relative rank of Sqdn.-Leader (Sept. 6).

Memorandum

Sec.-Lieut. A. E. Morecroft is deprived of his honorary commission on conviction by the Civil Power (Aug. 9).

Reserve of Air Force Officers

The follg. are granted commissions in Class A.A., General Duties Branch, as Pilot Officers on probation :—A. L. Muir (Sept. 13), E. L. Purdy, M.C. (Sept. 16).

The follg. are confirmed in rank :—Flying Officer C. E. M. Pickthorn, M.C. (Sept. 23). Pilot Officers.—G. N. Warwick (Aug. 28), H. C. Barrett (Sept. 28).

The follg. Flying Officers are transferred from Class A to Class C :—W. E. de B. Diamond (Sept. 2) ; F. A. Smith, A.F.C. (Sept. 25). Pilot Officer E. F. S. Hughes is transferred from Class B.B. to Class C (Sept. 28). Flight-Lieut. G. Kinneir is transferred from Class D.2 to Class D.1 (May 7). Flying Officer G. Colledge relinquishes his commission on completion of service (May 29).

AUXILIARY AIR FORCE

General Duties Branch

The follg. to be Pilot Officer :—No. 600 City of London (Bombing) Squadron : L. A. Hackett(Sept. 7).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Group Captains : A. B. Burdett, D.S.O., to Air Ministry on appointment as Deputy Director of Organisation ; 21.9.26. R. P. Mills, M.C., A.F.C., to H.Q., India, for Air Staff duties ; 21.9.26.

Wing Commanders : E. R. C. Nanson, D.S.C., A.F.C., to Station Commandant, Hinaidi, for Air Staff duties ; 21.9.26. A. B. Gaskell, D.S.C., to H.Q., Iraq, for Air Staff (Armoured Car) duties ; 21.9.26. D. L. Allen, A.F.C., to No. 2 Wing H.Q., India, pending taking over command ; 21.9.26. L. A. Pattinson, D.S.O., M.C., D.F.C., to H.Q., India, for Air Staff duties ; 21.9.26.

Squadron Leaders : J. McCrae, M.B.E., to Station Commandant, Hinaidi ; 21.9.26. G. S. M. Insall, V.C., M.C., to Station H.Q., Basrah ; 21.9.26. A. S. Morris, O.B.E., to No. 5 Armoured Car Co., Iraq ; 21.9.26. C. E. H. Medhurst, O.B.E., M.C., to H.Q., Iraq ; 21.9.26. C. H. Keith, to No. 70 Sqdn., Iraq ; 21.9.26. F. J. Vincent, D.F.C., to Aircraft Depot, Iraq ; 21.9.26. C. O. F. Modin, D.S.C., to H.M.S. *Eagle* ; 30.9.26. S. R. Watkins, A.F.C., to R.A.F. Base, Gosport, 20.9.26.

Pilot Officers : R. C. Whitle, to No. 60 Sqdn., India ; 14.8.26. C. S. Cade, and J. H. Edwardes Jones, to No. 5 Flying Training Sch., Sealand, on appointment to Permanent Commns. ; 18.9.26. E. H. Collinson, M.C., and C. A. C. Patton, to No. 14 Sqdn., Palestine ; 4.9.26. W. A. Andrews and J. F. Lawn, to No. 19 Sqdn., Duxford ; 30.9.26. W. E. Barnes, J. Blackmore, W. G. Campbell and L. H. Mason, to No. 207 Sqdn., Eastchurch ; 30.9.26. H. C. G. Dauncey, to No. 23 Sqdn., Henlow ; 30.9.26. H. G. Loch, to No. 43 Sqdn., Henlow ; 30.9.26. T. F. Moloney, C. M. Peabody, R. T. Read and J. T. Riggs, to No. 12 Sqdn., Andover ; 30.9.26. L. G. Rumsey, to No. 39 Sqdn., Spittlegate ; 30.9.26.

The undermentioned Pilot Officers are posted to No. 5 Flying Training School, on appointment to short service commns. (on probation), with effect from 18.9.26 :—G. C. Bainbridge, G. Bartholomew, A. K. K. Calwell, J. F. Duff, F. G. Fairhead, G. P. T. Gibbons, M. Griffiths, H. C. D. Hayter, D. S. King, F. E. Liddell Reynolds, V. D. Morshead, J. A. Rogers, E. L. J. Rowe, H. H. R. Schleman, C. K. Turner Hughes, G. R. Weighill.

Stores Branch

Squadron Leaders : F. G. M. Williams, to H.Q., Iraq ; 21.9.26. T. Fawdrey, M.B.E., to Supply Services (Directorate), Iraq ; 21.9.26. F. F. J. Coates, to H.Q., Iraq ; 21.9.26. H. T. Foxen, to Fighting Area H.Q., Uxbridge ; 20.9.26.

Flight Lieuts. : T. G. Bowler, to Station H.Q., Andover ; 28.8.26. G. A. Curtis, to H.Q., Iraq ; 21.9.26. L. H. Vernon, to Wessex Bombing Area, Andover ; 15.9.26.

Flying Officers : F. A. Skoulding, to H.Q., Cranwell ; 6.8.26. V. B. Ranford, to Air Ministry ; 13.9.26. W. F. Langdon, to No. 601 County of London (Bombing) Sqdn., Northolt ; 12.9.26.

Flying Officers : G. F. P. Warren, to No. 11 Sqdn., Netheravon ; 28.8.26, C. Hanson-Abbott, to Elec. and Wireless Schl., Flowerdown ; 28.8.26. H. J. Payne, to Station Commandant, Basrah ; 21.9.26. A. J. Walker, to Store. Depot, Iraq ; 21.9.26. C. P. Wingfield, to H.Q. Spec. Res. and Aux. Air Force ; 21.9.26. F. B. Ludlow, O.B.E., M.C., to Aircraft Depot, India ; 21.9.26.

Pilot Officers : H. N. Davies, to Home Aircraft Depot, Henlow ; 28.8.26. R. H. Clay, to Aircraft Depot, Iraq ; 21.9.26.

Medical Branch

Flying Officers : E. A. Rice, M.B., and C. W. Coffey, to R.A.F. Depot, Uxbridge ; 17.9.26. J. Hutchieson, M.B., to R.A.F. Base, Gosport ; 17.9.26.

NAVAL APPOINTMENT

The following appointment was made by the Admiralty on October 2 :—

Commr.—I. B. B. Tower, D.S.C., to *Victory*, addl., to be lent to R.A.F. Base, Gosport, for instruction in deck landing training ; Sept. 23 to Oct. 21.

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RUGBY FOOTBALL

R.A.F. Depot, Uxbridge *v.* Napier R.F.C.

By Major F. A. De V. ROBERTSON

On Saturday, October 2, it was still summer time, and the sun was determined to show that it was still summer. It would have been an ideal afternoon for a languorous game of croquet, followed by a bathe and iced drinks. All the more honour, therefore, to the strong men of Uxbridge and Napier's who spent part of that balmy afternoon in a strenuous game of Rugger on a ground which seemed like to crack with the heat. There was stern tackling, too, and at the end of the game few knees were not scratched and bleeding.

So early in the season one expects to see ragged football, particularly as regards the forward play. There certainly was a good deal of ragged play in this match, but, strangely enough, the forwards on both sides played right well. The Napier pack were a very hefty lot ; they shoved splendidly in the scrums, and went hard in the loose. In the vast majority of the scrums they got the ball and heeled cleanly. Cleverley was the most prominent, while Pate (who in private life is a director) did solid work. Huggins at the scrum was quick to get the ball away, but at that point things always went wrong. There was not a trace of moisture, other than animal grease, to take the polish off the new ball ; and, up to the end of the game, the three-quarters on both sides found it difficult to give and to take passes. The usual way of gaining ground was to take a flying kick, and follow up hard. All the same, there were several occasions when the Napier left wing three-quarter ought to have passed to his right instead of trying to insinuate himself through an impossibly narrow aperture between the scrum and the touch line.

In the first half of the game Napier's did most of the pressing, and ought to have scored. The Uxbridge defence, however, was very sound. Their full back, Bailey, always found touch, though his kicks lacked length. The teams changed over without scoring.

In the second half the superior training of the Service team began to take effect. Smithson, at the scrum, played a great game, and the Depot commenced a series of attacks. Schofield got over once, but was whistled back. Another almost certain score ended in touch-in-goal. There were constant scrums on the Napier line, and at last a gallant defence broke down, when Smithson dived over for a try. The kick failed. A few minutes later an Uxbridge three-quarter, Moseley I think it was, dropped a very good goal with his left foot. The Depot thus won by 7 points to love.

Both sides showed promise of making good teams as the season advances. Teams :—

R.A.F., Uxbridge.—Full back, A/C Bailey ; three-quarters, Cpl. Turner, A/C Schofield, A/C Moseley, L.A/C Aerons ; halves, Cpl. Smithson, A/C Webb ; forwards, F/Lt. Carr (captain), Sgt. Broadway, Sgt. Moore, A/C Booth, A/C Wray, A/C Warren, Sgt. Buckley, L.A/C O'Malley.

Napiers.—Full back, Marks ; three-quarters, Whymper, Harvey, Wright, Foulds (captain) ; halves, Huggins, Owen ; forwards, Pate, Elgie, Cleverley, Young, Rowe, Benson, Scott, Pearson.

IMPERIAL AIRWAYS, LTD.

The second annual report of Imperial Airways, Ltd., issued on September 14, indicated a loss of £20,415, the explanation of which, states the report, is twofold. Firstly, delay in the delivery of new machines prevented the company from earning the increased revenue anticipated, resulting in much traffic passing to the benefit of the foreign competing companies, and a reduction of £12,015 to £21,749 in the balance from trading account. Secondly, £27,167 (as against £22,998) had been placed to the reserve for obsolescence, due to the decision of the board to write off single-engined machines in favour of multi-engined types for use on the passenger services. Maintenance costs amounted to £62,654 12s. (compared with £61,712 4s. for the preceding year).

Fresh capital, the report continues, was needed for the five new machines now under construction for use on the Egypt-India service, and the uncalled balance of 10s. per share would be called up by two calls of 5s. each, the first to be made shortly after the second general meeting.

At the second ordinary general meeting, held at the Hotel Cecil on September 22, the Right Hon. Sir Eric Geddes, Chairman, stated that the prospects of the company were steadily improving, and that a less courageous, prudent, and conservative Board might have felt justified in presenting a rosier picture than that shown by the bare figures in the accounts. On the assets side of the balance-sheet, aircraft and engines (as at March 31, 1925, plus additions during the year) stood at £181,000, and nearly £19,000 had been written off in respect of units which were considered obsolete. The bulk of this concerned single-engined aircraft which were withdrawn from the regular European services at the beginning of the current financial year. These were perfectly efficient aircraft of their class, and were it not for the very limited market for second-hand aircraft, the Board would have retained them at a fair sale value.

Additions during the year of £63,500 represented mainly the purchase of modern and more economical multi-engined machines which commanded the greatest public confidence. Plant and machinery, etc., had been adequately depreciated, and stores and spare parts were valued on a conservative basis.

In the year under review maintenance accounted for an expenditure of £62,600. This matter had received the closest attention of the board, and the relative cost of maintenance had, in effect, now been reduced. The reductions did not show in the profit and loss account because the change to the more economical aeroplane was taking place during the year, and, although the new aircraft were in the course of construction the obsolescent ones had to be maintained during this period—and at excessive expense—up to the highest standards in conformity with the policy of the board in putting safety and reliability first. This item could not be considered apart from obsolescence, and the board felt it was their duty to provide the heavy reserve for obsolescence of £27,000. Under the standard of maintenance which was necessary in civil aviation an aeroplane up to the date it was written off had to be maintained at the highest possible efficiency, and therefore in the accounts under review the highest standard of maintenance was applied to these aeroplanes, and the very day they came out of the service they were written down to nothing in the books.

Their traffic, said Sir Eric, was rising, and this summer's results enabled him to state with redoubled confidence, that their policy was drawing traffic to them, and was creating a valuable goodwill.

During the first five months of the current financial year they had carried more passengers than in the whole year dealt with in the accounts under consideration. They had endeavoured to provide the public with a service established on the safety and reliability typical of British transport and organisation, and they would without doubt reap the reward of their policy.

They were doing everything possible, in closest co-operation with other European air transport companies, to develop through-connections and through-bookings; gratifying progress was being made, and there was no doubt that as the through time-table developed they would get an increasing number of long-distance passengers.

Referring to the Egypt-India service, Sir Eric said that the construction of new aeroplanes and engines was progressing satisfactorily, and the service should commence in January next. These machines were being fitted with three air-cooled engines each, and would be capable of easily maintaining their flight with two engines only. The first flight from Cairo to Karachi was scheduled to take place at the end of this year, and the first aeroplane to fly on that epoch-making route would carry the Secretary of State for Air and his personal staff, as well as Lady Maud Hoare, who would accompany her husband on the complete flight from London to Karachi.

The Board, he concluded, proposed to call up the remaining 10s. per share capital almost immediately. The money was required to complete the machines and equipment for the new route and to provide adequate working capital for the European services. Generally, while the Board deplored the loss on the second year's trading, they found the consolation in the improved situation which had followed the changes made in the fleet, and they felt fully justified in adhering to their bold policy. They believed that the European services would be run profitably this year, and that the new service should add to those profits in subsequent years.

Incidentally, Sir Eric mentioned that in pursuit of economy the board has set an example and a standard itself. Under the articles of association the board is entitled to draw remuneration on the scale of £6,500 per annum, but at the present time they have decided to reduce these fees, and are drawing a total remuneration at the rate of £2,500.

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PUBLICATIONS RECEIVED

Annual Report of the Meteorological Committee to the Air Council for the Year ended 31*st March*, 1926. H.M. Stationery Office, Kingsway, London, W.C.2. Price 2*s*. net.

All the World's Aircraft: 1926. *Compiled and Edited by* C. G. Grey. *Founded in* 1911 *by Fred T. Jane.* Sampson Low, Marston and Co., Ltd., 100, Southwark Street, London, S.E.1. Price £2 2*s*. net.

Aeronautical Research Committee Reports and Memoranda: No. 1006 (*Ae.* 212).—Full-scale and Model Measurements of Lift and Drag of Bristol Fighter, with R.A.F. 32 wings. By E. F. Anderson, L. E. Caygill, and R. McKinnon-Wood. December, 1925. Price 6*d*. net. *No.* 1007 (*Ae.* 213). Full-Scale and Model Measurements of Lift and Drag of Bristol Fighter, with Handley Page Slotted Wings. By E. T. Jones and L. E. Caygill. December, 1925. Price 9*d*. net. *No.* 1009 (*Ae.* 215).—Experiments on the Flow Behind a Rotating Cylinder in the Water Channel. By E. F. Relf and T. Lavender. May, 1925. Price, 9*d*. net. H.M. Stationery Office, Kingsway, London, W.C.2.

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A Traverse de Monde. La Société Lorraine Dietrich, Argenteuil (S. et O.), France.

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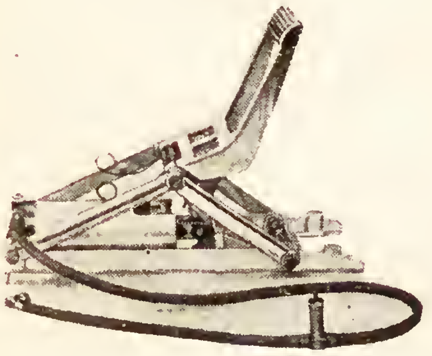

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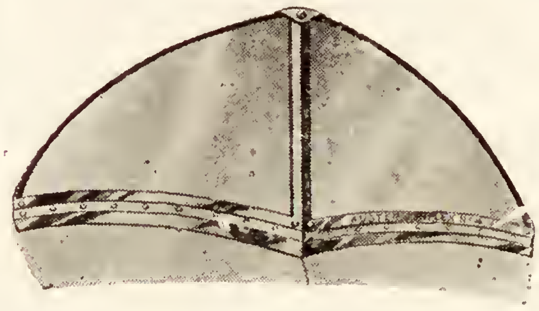

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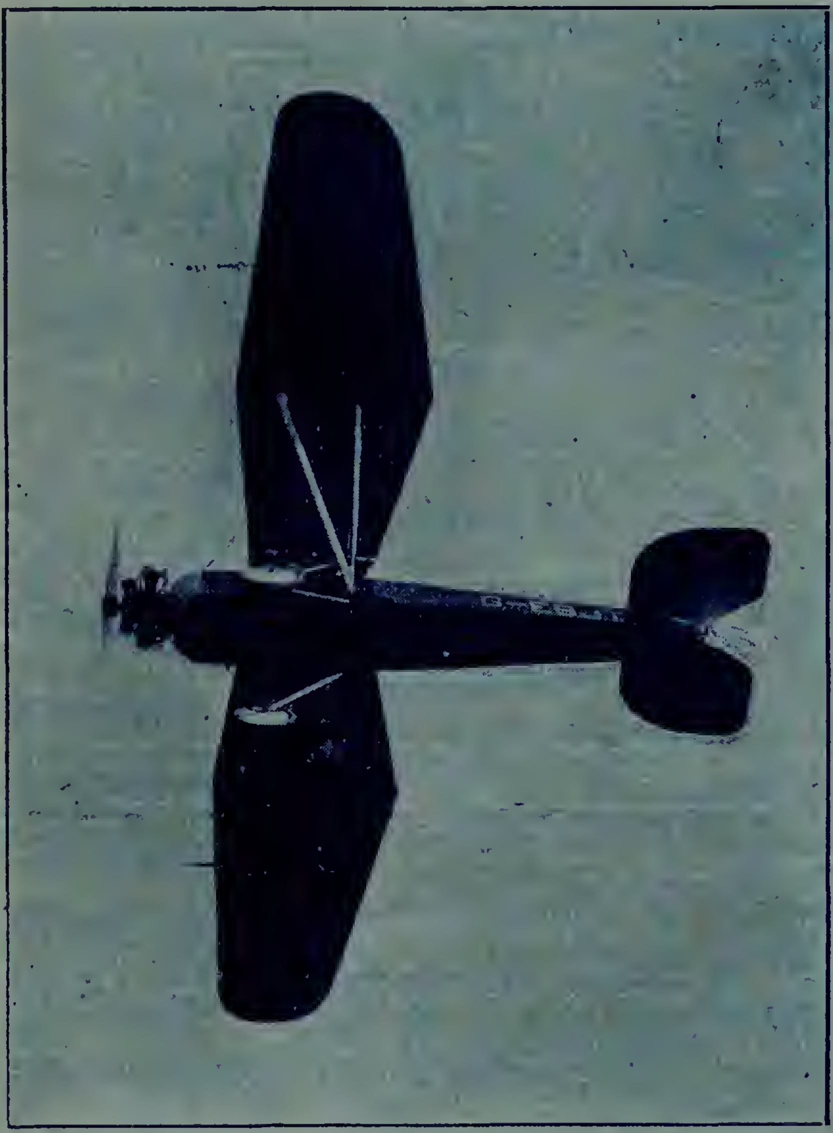

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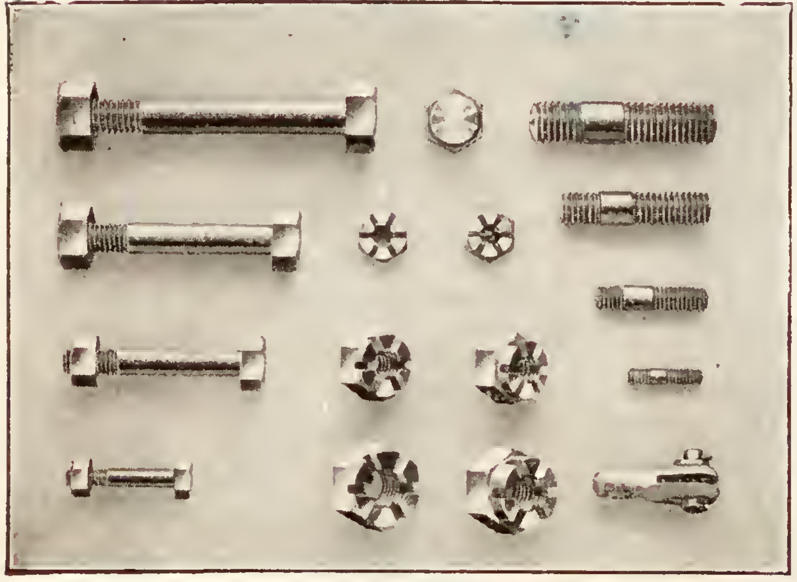

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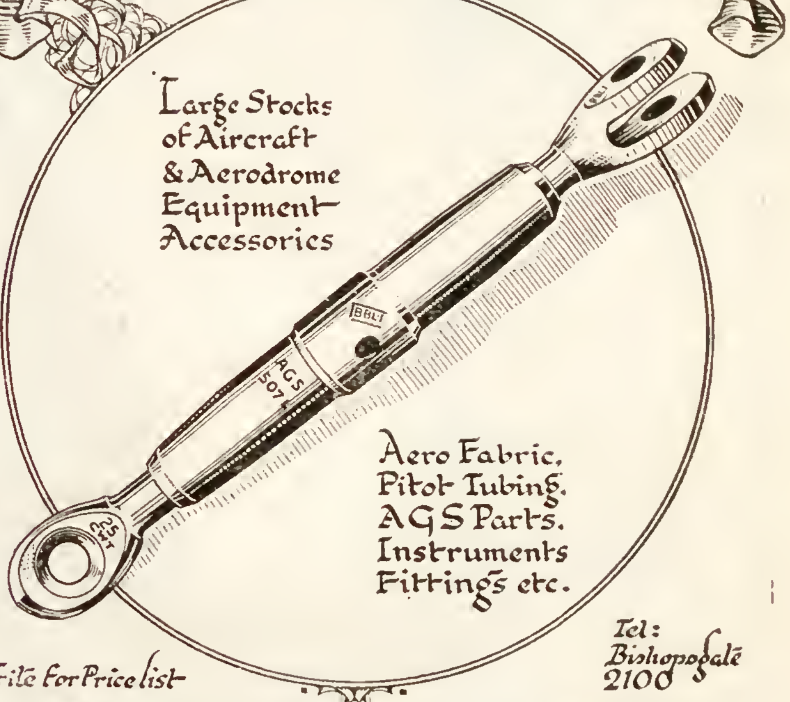
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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926
Oct. 17 .... Lecture, "Scientific Problems of Commercial Aviation," by Air Vice-Marshall Sir W. S. Brancker, at the Guildhouse, Eccleston Square, S.W. 1.
Oct. 21 .... Mr. W. R. D. Jones, M.Sc. "Notes on Magnesium and some of its Alloys," before R.Ae.S.

EDITORIAL COMMENT.

Small 3-engined Aeroplanes

FROM time to time we have touched, in these columns, upon the subject of three-engined aeroplanes of relatively low power, pointing out that there may very well be, and in all probability will be in the near future, a very considerable field of usefulness for this type of machine in localities in which the volume of traffic is not yet sufficient to justify the use of high-powered, three-engined machines, but where the reliability that, it is hoped and believed, the three-engined arrangement will afford, is very much to be desired. In this connection one immediately thinks of night-flying services, and of flying in weather conditions of bad visibility due to low clouds or fog. If the three-engined type comes up to expectation, it is particularly for such conditions that it should score over single-engined or twin-engined machines. This applies, of course, to the three-engined type generally, irrespective—within limits—of size and power. It is true that as yet we have not sufficient practical experience of the type to be able to say definitely whether or not the expected immunity from forced landings is provided by splitting up the power plant into three units, any two of which are capable of keeping the machine in the air until the destination is reached, or, at any rate, until a suitable intermediate landing-ground can be chosen in which to alight without risk. If, however, we look outside Great Britain it is found that in other countries also, and particularly in Germany, there is a strong tendency towards developing the three-engined aeroplane, and thus we are not alone in this country in looking towards this type for that reliability which is one of the first essentials of real commercial aviation. Taking it all around, therefore, it appears justifiable to assume—at any rate, until and unless the contrary is proved—that the three-engined machine is worth developing.

If this holds good for the large machine, it equally applies to the smaller. There is, however, this to be argued against the relatively low-powered three-engined aeroplane, that it is likely to be rather less efficient than the single-engined of the same power. This is so for various reasons. To begin with, three engines developing between them a total of, for the sake of argument, 300 h.p., are almost certain to weigh more than one engine of the same power, and it is also probable that the fuel consumption may be slightly greater. Secondly, there is the fact that placing two of the three engines outboard must almost certainly add to the drag of a machine, and that consequently the aerodynamic efficiency would seem to tend to be rather lower. By distributing the engine weight there should be a slight saving in structure weight; but, on the other hand, this is probably offset to a large extent by the necessity for special strengthening demanded by the mounting of the engines on the wing structure. Having admitted these drawbacks, and conceded the point that the three-engined aeroplane, in the smaller sizes at any rate, may be slightly less efficient, the use or otherwise of the type will obviously depend upon whether or not the added reliability is worth the slight loss in efficiency. We think the answer must be that in some cases the reliability of the three-engined arrangement is not only worth the sacrifice, but is absolutely essential. In other cases this might not be so. It will depend largely upon circumstances, and there is still—and will, we think, continue to be for many years—room for both types.

As the first modern concrete example of the three-engined aeroplane of moderate power—in this country, at any rate—considerable interest in this connection naturally attaches to the new Handley Page "Hamlet," which is now nearing completion at Cricklewood, and which is described by us in some detail this week. The "Hamlet" was first referred to, in official publications, as a "postal" machine. As actually produced, however, it is a passenger-carrier, with room for four passengers in addition to the pilot. The power plant consists of three Bristol "Lucifers," of the type IV, which develops a maximum of 120 h.p. In its present form, and with fairly heavy and elaborate cabin equipment, the machine carries fuel for three hours' flying, and, with the range corresponding to this quantity of fuel, the paying load is 800 lbs. Taking horse-power per passenger carried as a basis, it is seen that at full power the expenditure is no less than 90 h.p. per passenger. This appears a somewhat high figure, and might, unless qualified, lead to an erroneous impression of the commercial efficiency of the machine. The actual weight of four passengers would probably average 650 lbs., so that there is at least another 150 lbs. available for useful load, either in the form of luggage, or in the shape of mails and/or goods. When these facts are taken into consideration, the power expenditure is at once seen to be a good deal smaller, and in any case full-power expenditure per passenger is not a very good criterion upon which to base one's judgment. What should be done, of course, is to use the power taken from the engine at cruising speed. In the case of the "Hamlet" this is, we believe, estimated to be just over two-thirds of the total—say, 250 h.p. at round about 100 m.p.h. Upon a passenger basis this still represents some 62 h.p. per passenger, which is admittedly rather high. But if we take, not the number of passengers but the useful load in pounds the figure is found to be, based upon cruising horse-power, 3·12 lbs. of paying load per horse-power. When it is remembered that the "Hamlet" is a relatively small machine (total loaded weight about 5,000 lbs.), this figure is by no means bad. If the cabin equipment were removed and the machine used for carrying mails or goods, another 200 lbs. would probably be saved, in which case the machine would carry 4 lbs. per h.p. at cruising speed and power. This figure begins to look a good deal more promising, and such a paying load would at once make the machine a practical proposition in many localities. Thus it rather looks as if in the smaller sizes the three-engined aeroplane might be a more economical proposition if used as a mail or goods carrier than in the form of a passenger machine, and a paying load of 1,000 lbs. would represent a not inconsiderable mail bag.

There is another aspect of the three-engined aeroplane which is, perhaps, somewhat apt to be overlooked, and which should receive due attention. We appear to have become obsessed with the figure 100 where speed is concerned. This is the figure now generally assumed as a necessary cruising speed for aeroplanes used on the European air routes, at any rate, on the British portions of them. Whether there really is any practical reason for this speed, or whether it is merely because it is a "nice round figure," we do not propose to argue here. Accepting for the moment this figure as essential to the utility of a service, it is obvious that if night flying could be introduced it would be possible to use machines with a much lower cruising speed, and consequently probably somewhat more efficient as regards paying load per horse-power. Offhand one would say that 50 m.p.h. would be sufficient, but, except for very long distances, calling for flying throughout the 24 hours, a somewhat higher cruising speed would probably be necessary. Even if we put the figure at 75 m.p.h., however, there is not much doubt that a machine cruising at this speed would be able to carry very much more paying load per horse-power than one required to cruise at 100 m.p.h. Thus, if full advantage be taken of these considerations, the small three-engined aeroplane might be a very attractive proposition.

In this connection we would even go so far as to express the opinion that machines of considerably lower power than the "Hamlet" might be worth while developing. If the figure of 75 m.p.h. be accepted as a sufficiently high cruising speed, there is little doubt that, even in much smaller machines, the paying load per cruising horse-power could be, at a conservative estimate, as high as 4 lbs. Thus, if we take a machine fitted, for example, with three of the new "Cirrus" Mark II engines, and assume that this machine would cruise on about two-thirds of the total power, we obtain a cruising horse-power of approximately 170 h.p., which, if the figure of 4 lbs. per horse-power paying load is attainable, would mean a paying load of 680 lbs. There can, we think, be little doubt that such a machine could be produced, and, if not on the European air routes, at any rate in the Dominions there should be an excellent field for night-and-day air mail services with this moderate load. Even if it should be necessary to cover fairly long stages, the extra fuel would not reduce the paying load below a reasonably useful figure.

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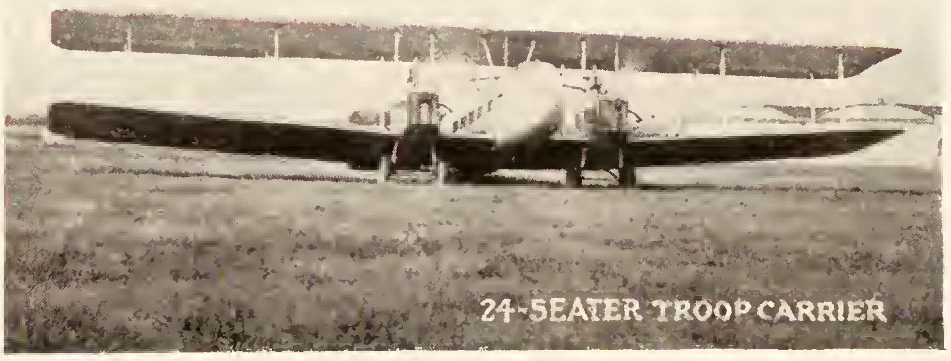

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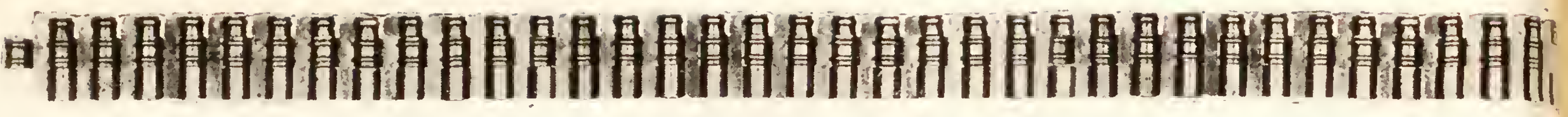

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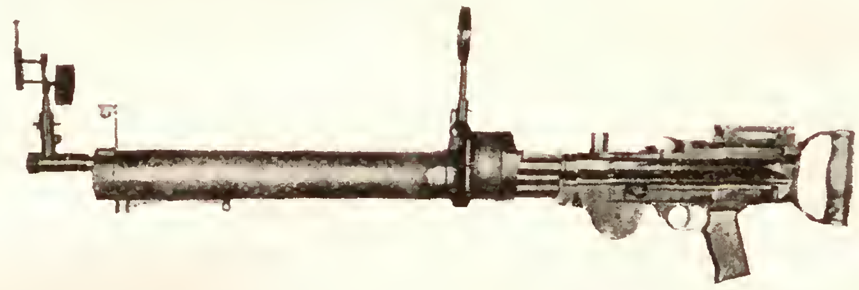

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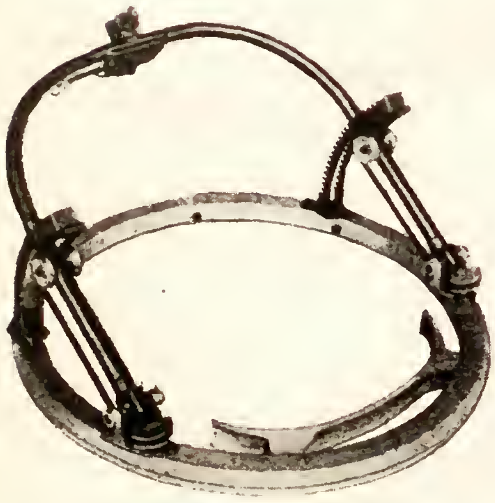

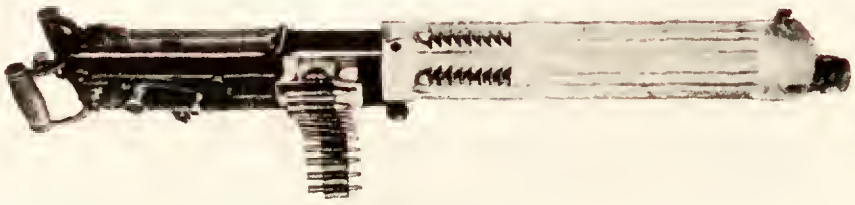

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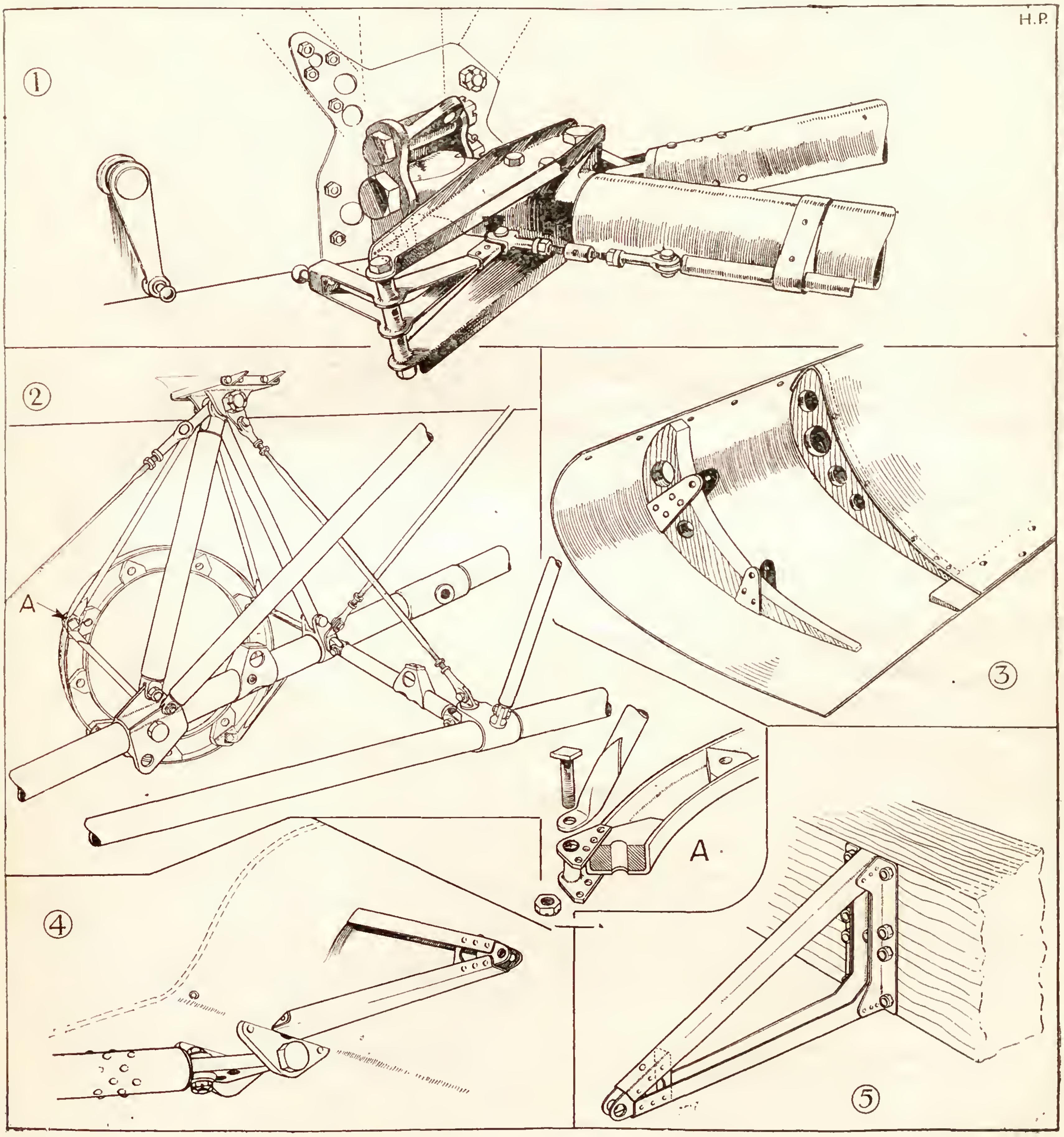
THE HANDLEY PAGE "HAMLET"

Three Bristol "Lucifer" IV Engines

IT is now quite a long time ago that official publications, such as annual Reports of the Aeronautical Research Committee, referred to the intention to have built an experimental three-engined mail aeroplane to be fitted with three Bristol "Lucifer" engines. For months—or, in fact, years—nothing materialised, and there was some excuse for assuming that the project had been "shelved." It is, therefore, all the more gratifying to be able to announce this week not only that the project is by no means dead, but that, as a matter of fact, the machine is nearing completion at the Cricklewood works of Handley Page, Ltd., and will in all probability be flying early next week. The machine in question has been



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THE HANDLEY PAGE "HAMLET": Some constructional details. 1 shows the very substantial fitting at the root of the wing struts, and also the arrangement and support of the port wing engine control, which runs along the front of the front strut in guides. The connecting link between the crank coming out of the fuselage and that on the control bracket is omitted. In 2 is shown the mounting, on the wing tubes, of the starboard wing engine as seen from behind. The small flat-topped brackets are for the support of the oil tank. The engine ring is machined from the solid and has packing pieces at intervals, as shown in 2A. Details of the leading-edge auxiliary aerofoi are shown in 3. The covering is Duralumin sheet put on over wood ribs. One of the brackets supporting the slotted trailing edge flaps is shown in 4, while 5 illustrates the manner of attaching the bracket to the main spar.

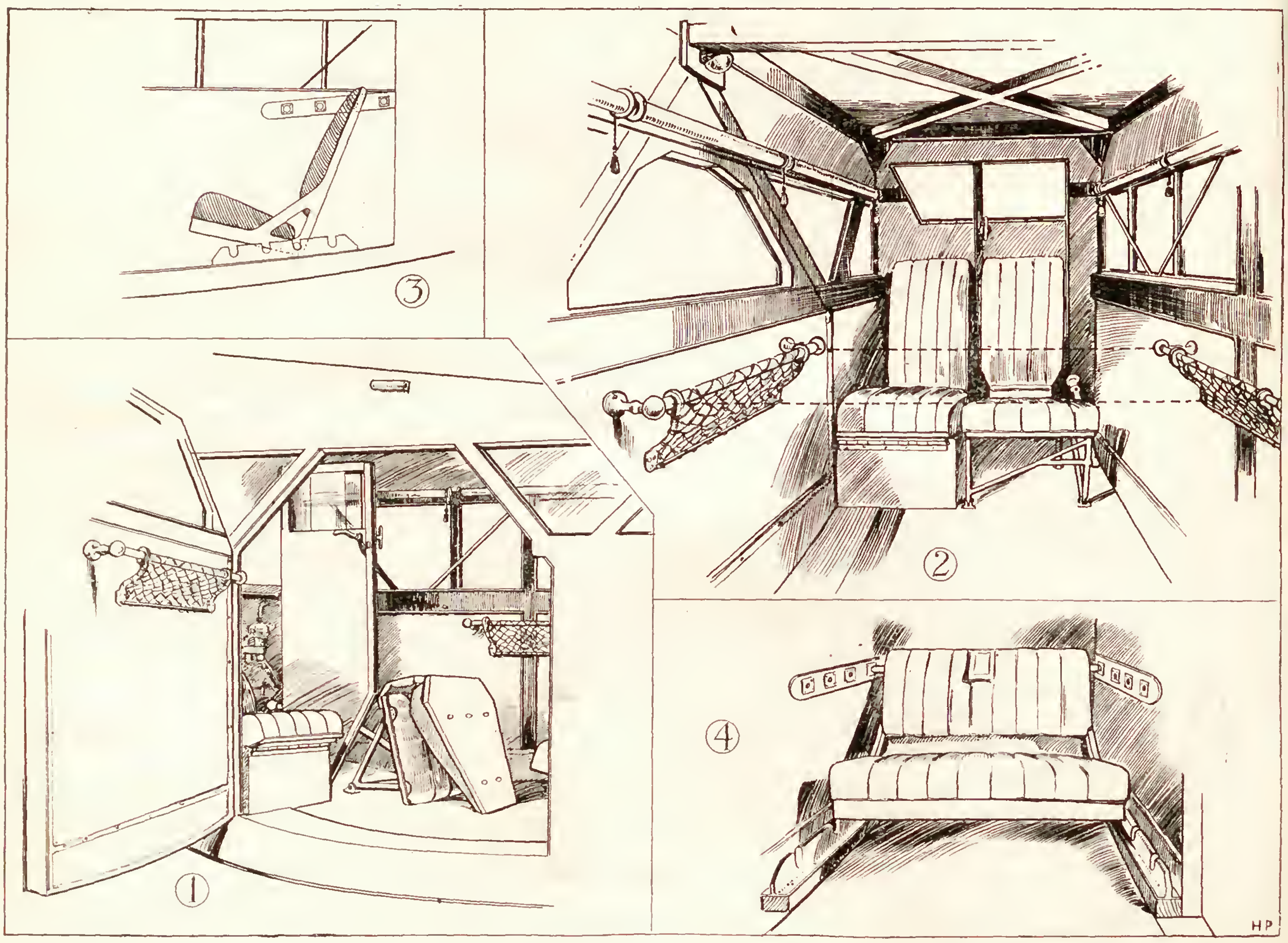
named the "Hamlet," and is a thick-wing monoplane fitted with leading-edge slots and trailing-edge slotted flaps. It would seem, however, that the original intention of producing the machine as a mail carrier has been abandoned, since the "Hamlet" appears in the form of a four-seater passenger-carrier.

Flight has urged repeatedly the importance of not losing sight of the three-engined aeroplane of relatively low power. Not that we are under any false impressions as regards the economy of such a type as compared with a single-engined machine of the same power. It is fairly certain that the three-engined type will not be quite as economical as the single-engined, but it is, we think, equally certain that in various parts of the British Empire there are opportunities for the type for use under conditions where the volume of traffic is not yet large enough to justify the employment of a large three-engined machine, but where the reliability of the three-engined arrangement is more essential than maximum economy. It is therefore with considerable pleasure that we welcome the new Handley Page "Hamlet," and we sincerely trust that it will not prove a "ghost" in any sense of the term.

As already mentioned, the new "Prince of Denmark" is a monoplane incorporating the Handley Page–Lachmann slotted aerofoil, and, incidentally, apart from having the distinction of being the first modern three-engined aeroplane of low power, the "Hamlet" is the first civilian machine with slotted wings to be ordered by the British Air Ministry.

The general arrangement and lay-out of the "Hamlet" are shown in the accompanying scale drawings, while some of the constructional features are illustrated by sketches. It will be seen that the monoplane wing is of rectangular plan form, while the wing section (RAF 31) is uniform from root to tip, and the wings are set at a pronounced dihedral angle. For a total loaded weight of 5,000 lbs. the span loading: $\frac{\text{Span}^2}{\text{weight}}$ is 0·54, a fairly high figure for a machine of this size, and which should thus keep the induced drag down to a rather low figure. (For instance, at an indicated air speed of 100 m.p.h. the induced drag for this machine would be approximately 115 lbs., corresponding to a thrust horse-power of about 31, or, assuming a propeller efficiency of 75 per cent., about 41 b.h.p.)

So far, therefore, as the wing arrangement itself is concerned, the new Handley Page "Hamlet" should be very efficient, especially as the section employed, that known as RAF 31, has a good L/D ratio when in its normal form. The addition of the slotted leading edge and slotted flaps is admittedly something of an experiment, and has not, as far as we are aware, been tried on this section at full scale before. The maximum lift coefficient of RAF 31, according to full-scale tests carried out on a Bristol Fighter (*see* Reports and Memoranda No. 990, Full Scale and Model Measurements of Lift and Drag of Bristol Fighter with RAF 31 Wings), is 0·635 at 18° incidence. We believe it is estimated that the stalling speed of the "Hamlet" will be in the neighbourhood of 47 m.p.h., which would correspond, with a wing loading of 12·9 lbs./sq. ft., to a maximum lift coefficient (full scale, of course) with slots open, of 1·1 (absolute). Presumably, therefore, experiments with slotted models of RAF 31 in the Handley Page wind tunnel have indicated that an increase in lift coefficient of this order may be expected.



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THE HANDLEY PAGE "HAMLET": 1 represents a peep into the cabin, through the open door in the port side. The door leading to the pilot's cockpit can be seen open and the seat in the front starboard corner is tilted out of the way of the door. In 2 is given a view inside the cabin looking forward, with the door to the cockpit closed and the seat in its normal position. Note the roller blinds and the net racks on the sides, which serve as supports for the removable table (shown in dotted lines). 3 is a side elevation of the back seat, showing method of supporting it cantilever fashion. 4 is a view inside the cabin looking aft. The flap in the back rest covers the handle which releases the catches securing the chair in position. When this is released the back seat can be moved to various positions.

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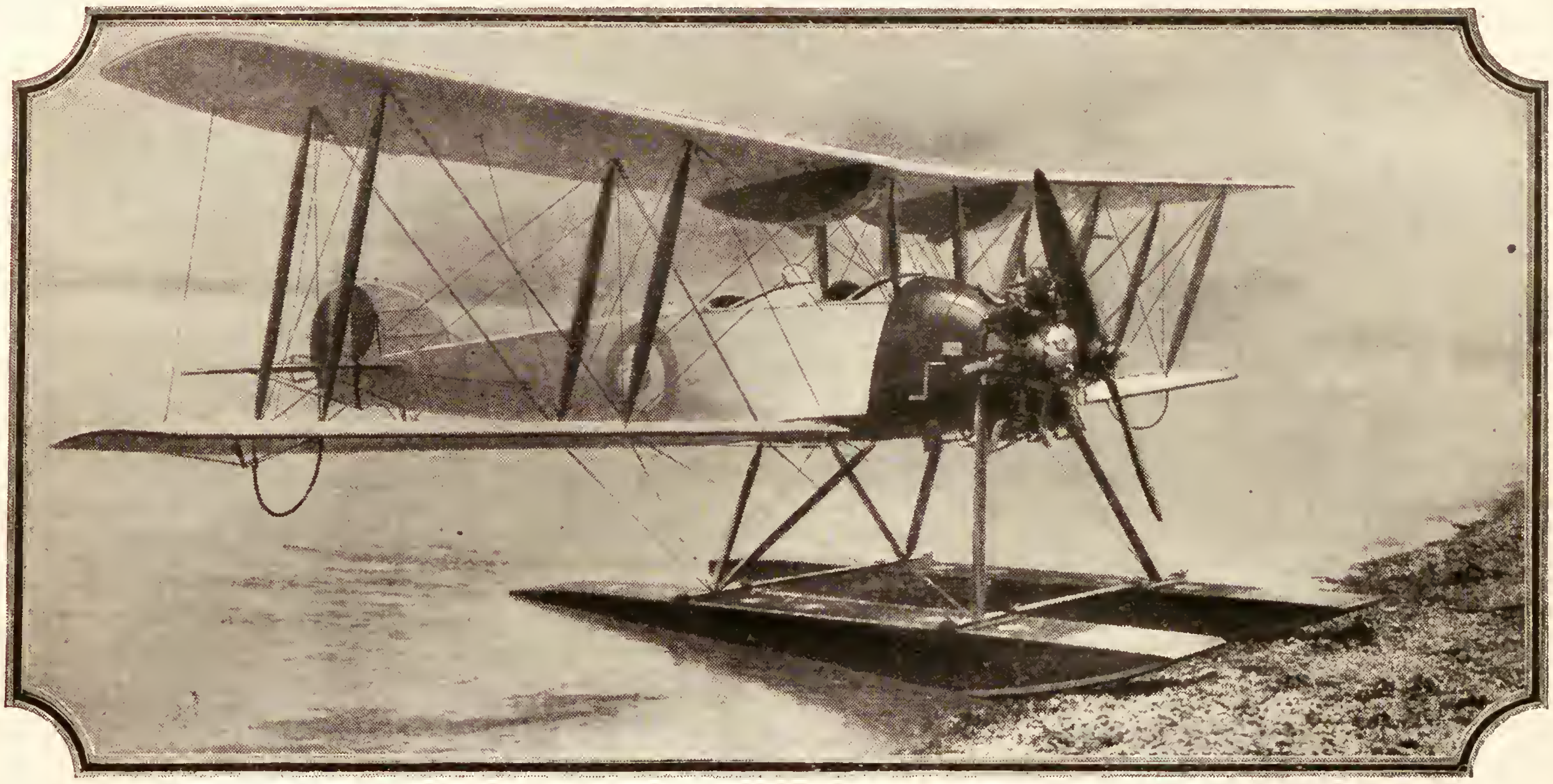

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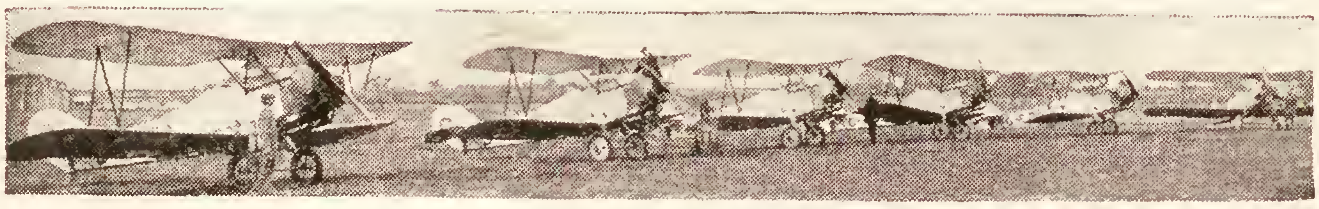

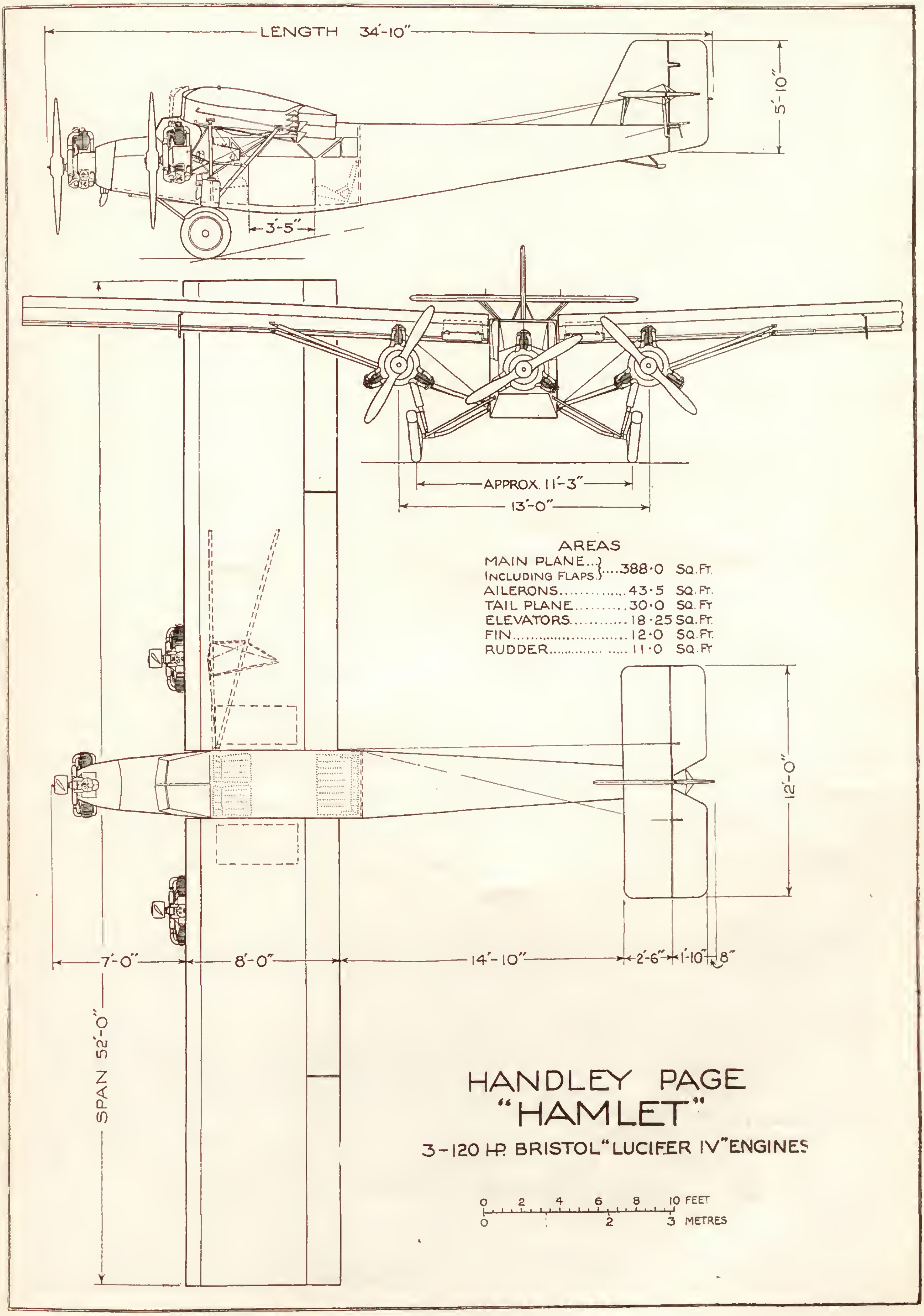

THE HANDLEY PAGE "HAMLET": General arrangement drawings, to scale.

Constructionally the leading edge slots of the "Hamlet" wings are of interest on account of the fact that the auxiliary aerofoil is not, as in several previous Handley Page machines, single surfaces of sheet Duralumin, but built-up aerofoil sections shaped so as to fit, when the slot is closed, snugly against the nose of the main aerofoil. Thus, presumably, the wing will have as low a drag with slot closed as the normal RAF 31 section. The auxiliary aerofoils are operated by torque tubes from the cockpit, and are interconnected with the slotted trailing-edge flaps, the outer portions of which, of course, retain their differential action as ailerons.

Although the monoplane wing of the "Hamlet" promises to be of very good aerodynamic efficiency, there would appear to be a probability that this efficiency may be somewhat lowered by placing two engines on the wing-bracing struts. This is almost inevitable—at any rate, with radial air-cooled engines—and must be regarded as the price to be paid for the extra reliability which the three-engine arrangement offers. Behind the two outboard engines are placed the oil tanks, of conical shape, but otherwise it is not intended to streamline the wing engines. The fuselage is of good shape, and is of fairly small cross-section considering that the machine has been designed as a passenger-carrier. On the whole, it can, we think, be said that the "Hamlet" is of clean design for a machine of this type, and we understand that the estimated top speed is in the neighbourhood of 118 m.p.h. (190 km./hr.), which, if attained, is distinctly good for a three-engined aeroplane of this power and wing loading.

Constructional Features

Generally speaking the "Hamlet" follows normal Handley Page practice as regards construction. The fuselage is of the girder type throughout, including the cabin portion, and is fabric covered. In a few instances short lengths of the bracing wires cross the cabin windows, but these lengths are so short as to interfere but little with the view, which, on account of the monoplane wing, is very good. Probably the fact of the cabin being fabric covered may serve to reduce to some extent the rather unpleasant "drumming" which one is apt to get in most cabin machines.

The wings are of fairly normal composite construction, with box-section spars having three-ply walls, and wooden ribs. The shaping of the front and rear slots has naturally necessitated rather careful work on the leading and trailing edges of the main wing, three-ply being the material used for the immovable portions of the slots. The wing bracing is in the form of large-diameter steel tubes meeting the two main spars and converging at a point on the lower longerons of the fuselage.

The engine mountings are also tubular, with the exception of the actual engine "rings," which are machined from the solid into a channel section Details are shown in our sketches Two petrol tanks are mounted inside the wing, one on each side of, and just outside, the fuselage. From the tanks the petrol flows by gravity to a distributor box in the cockpit, from which again, via suitable petrol cocks, either or all engines can be supplied from either or both tanks.

The pilot's cockpit, situated between the front wall of the cabin and the bulkhead behind the central engine, is very roomy and affords an excellent view. The cockpit is particularly plentifully supplied with "gadgets," since there is not only the slot operating gear to attend to but also a complete wireless installation. The various controls are, however, conveniently placed, and the engine controls are of very simple type, so that in spite of the three-engined arrangement the number of controls is not excessive.

The Cabin

From the pilot's cockpit a door on the starboard side leads to the cabin, which has seats for four passengers, of whom two face forward and two aft. The seat in the front-starboard corner of the cabin is hinged so as to swing out of the way when it is desired to pass from cabin to cockpit or vice versa, and a handle projects from this seat into the cockpit so that the pilot can, when this seat is not occupied, swing it out of the way and open the communicating door. The seats are well upholstered and very comfortable, and provision has been made for carrying permanently a table which, when in use, rests on the tubular rails of the nets on the side walls of the cabin. The entrance door is on the port side, and the machine is so designed that passengers can step straight into the cabin from the ground without the use of steps. Emergency ripping panels are provided in the roof, and the windows are provided with silk roller blinds in place of the more usual curtains. Altogether the cabin is most comfortable and in spite of the fact that it is not of very large dimensions (104 cubic feet) does not at all, for some reason, give one the impression of being shut into a cramped space which one frequently gets in very much larger cabins. At the moment it is, of course, impossible to say how far the cabin of the "Hamlet" will be noisy or not. This can only be decided after prolonged flying in the machine. But otherwise the cabin is exceptionally comfortable, and it is quite evident that the designers have aimed at comfort rather than weight-saving in its equipment, a policy which is entirely justified.

The main data relating to the Handley Page "Hamlet" are as follows:—Length over all 34 ft. 10 in. (10·6 m.); wing span 52 ft. (15·85 m.); wing chord, 8 ft. (2·435 m.); wing area, 388 sq. ft. (36 m.^{2}); weight of machine bare, 3,105 lbs. (1,410 kg.); weight of instruments, cabin equipment, etc., 270 lbs. (122·7 kg.); petrol, 74 gallons (337 litres); oil 7 gallons (31·9 litres); weight of pilot 180 lbs. (82 kg.). Useful load (4 passengers and luggage), 800 lbs. (363 kg.). Total loaded weight, 5,000 lbs. (2,270 kg.). Wing loading, 12·9 lbs/sq. ft. (63·2 kg/m^2). Power loading (3 engines at 120 h.p.), 13·9 lbs./h.p. (6·32 kg/h.p.). "Wing-power" (*i.e.* ratio of horsepower to wing area), 0·928 h.p./sq. ft. (10 h.p./m^2). Power loading with 2 engines running, 20·8 lbs./h.p. "Loading-figure" (*i.e.* power loading multiplied by square root of wing loading) 50. Estimated top speed, 118 m.p.h. (190 km./h.). Cruising speed 100 m.p.h. (161 km./h.) Landing speed 47 m.p.h. (75·7 km./h.). Speed with two engines running, 90 m.p.h. (145 km./h.)

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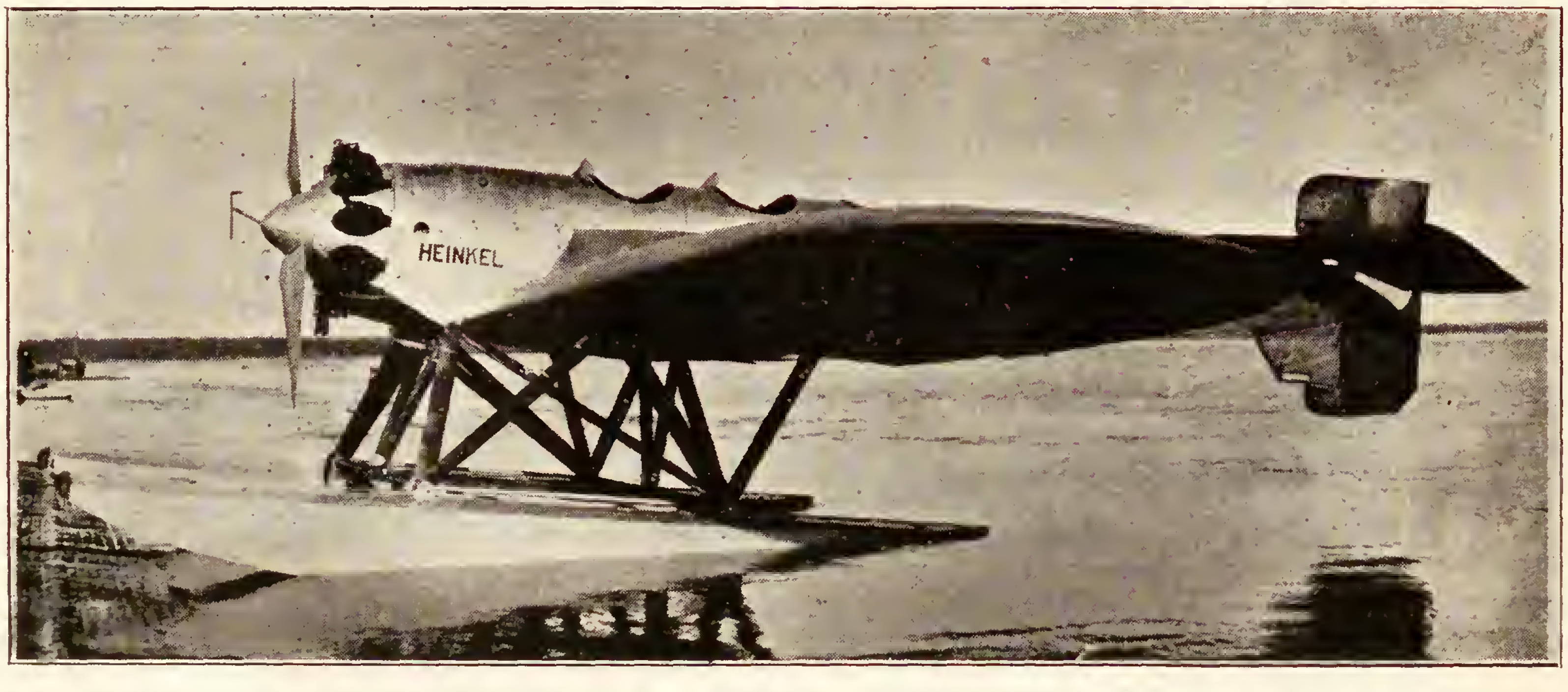

THE BRISTOL "JUPITER" IN GERMANY: The Heinkel H.E.5 mono-seaplane fitted with a Bristol "Jupiter" engine. It was this type of machine which did so well in the recent Warnemünde competition, until it came to grief in the seaworthiness tests.

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Plymouth to Alexandria and back by two Royal Air Force Supermarine Southampton flying boats, each fitted with two Napier Lion engines.

Spain to Buenos Aires by a Dornier flying boat fitted with two Napier Lion engines, flown by Major Franco.

In the above flights the total engine mileage was 96,118.

In a competition in Germany to discover the best German commercial seaplane, the First Prize was awarded to the only Napier-engined machine entered—the Heinkel-Napier.

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The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

COMMITTEE MEETING

A meeting of the Committee was held on October 6, 1926, when there were present :—Lieut.-Colonel Sir Francis K. McClean, A.F.C., in the chair, Air Vice-Marshal Sir W. S. Brancker, K.C.B., Mr. Ernest C. Bucknall, Lieut.-Colonel M. O. Darby, Mr. E. J. B. How, Wing-Comdr. T. O'B. Hubbard, M.C., A.F.C., Mr. F. Handley Page, C.B.E.

Election of Members.—The following new members were elected :—

James Alexander Atkinson.
Flying Officer Henry Charles Emanuel Cyril Ponsonby Dalrymple.
Capt. Frederick Edward Guest.
Stanley Woodward.
Flying Officer George Terrell.
George Frederick Acland Johnsen.
Lieut.-Comdr. Sidney Edgar Deacon.
Thomas Andrew Dennis.
Flying Officer Robert Howard Windsor.
Flying Officer Guy Marcus Trundle.
Flying Officer Herbert Gardner Travers.
George Saunders.
Flight-Lieut. W. F. Anderson.
Squad.-Leader H. Dawes.

Aviators' Certificates.—The following aviators' certificates were granted :—

8013	John Frederick Wilkinson	July 13, 1926.
8014	George Alexander Ronald Malcolm	July 22, 1926.
8015	Leicester John Cecil Mitchell	July 30, 1926.
8016	Cyril Edwin Murrell ..	August 3, 1926.
8017	John Stuart Merson Michie	August 6, 1926.
8018	Cecil Thompson, Jun. ..	July 27, 1926.
8019	Leslie Smith	July 29, 1926.
8020	Alfred Leonard Alwyn Goodyear	August 1, 1926.
8021	Frederick Howard Phillips	August 1, 1926.
8022	Hubert Breffitt Leaster Dixon	July 30, 1926.
8023	Eric James Brighton ..	July 28, 1926.
8024	George Vivian Perry ..	July 28, 1926.
8025	Cecil Leonard Knox ..	August 4, 1926.
8026	Harold John Willis ..	July 28, 1926.
8027	William Richard Massey ..	August 25, 1926.
8028	Dent Hugh Turner Lancaster	August 27, 1926.
8029	Wilfred Swann	July 28, 1926.
8030	Reginald Lister Jackson ..	August 5, 1926.
8031	Leonard Arthur Hackett ..	Sept. 6, 1926.
8032	Charles Ali Akbar Agar ..	August 8, 1926.
8033	Harold Oswald Young ..	Sept. 7, 1926.
8034	Robert Fawcett Little ..	Sept. 9, 1926.
8035	Nicolas de la Borda ..	Sept. 20, 1926.
8036	Oliver John Tapper ..	Sept. 22, 1926.
8037	Thomas Courtis	Sept. 23, 1926.
8038	George Harold Neville Larden	Sept. 28, 1926.
8039	Hellmuth John Stieger ..	October 4, 1926.

Sub-Committees.—The reports of Racing, House and Finance Committees were received and approved.

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The total flying time for the week ending October 10 was 38 hours 20 mins. The weather prevented any flying on Saturday last.

The following members had dual instruction :—H. Spooner, S. H. S. Garne, A. F. Beauchamp, A. J. Richardson, W. L. S. McLeod. T. C. Angus, A. L. A. Petty, S. C. Richards, G. N. Howe, J. G. Crammond, R. A. St. John, H. R. Godfrey, C. H. Tutt, P. W. Hoare, H. F. Wight, E. A. Lingard, T. C. Elford, Lady Bailey.

The following members made solo flights :—Miss O'Brien, O. J. Tapper, S. H. S. Garne, Capt. W. Roche Kelly, E. S. Brough, Lady Bailey, W. Hay. R. C. Presland.

Joy rides were given to the following Members :—A. J. Symmonds, Miss M. Webb, E. S. Brough.

G-EBLI, just returned from the works after its crash on September 17, has again been involved in a further episode. S. H. S. Garne, flying solo, misjudged his landing, with the result that the undercarriage, wings and fuselage were considerably damaged.

T. H. O. Richardson passed the tests for his Aviator's Certificate on Wednesday, October 6, 1926, flying on his own Avro.

The Hampshire Aeroplane Club

Report for week ending October 7.—Total flying time, 14 hrs. 38 mins. Instruction flying, 12 hrs. 30 mins. Passenger flying, 1 hr. 23 mins. Solo flying, 45 mins.

The following members received instruction :—Miss Home, Messrs. Perfect, Moloney, Bound, Courtnay, Stokes, Dickson, Appleford, Nicholson, Dartnall, Sommer, Kerry, Everett, Cooper, Dobson, Vanden Bergh.

The following members received joy-rides :—Miss Timson, Mrs. Cook-Hurle, Mrs. Morton, Messrs. E. O. Smith, and Alexander.

Messrs. S. Fry, K. P. L. Bowen, and Flight-Lieut. Crawford flew solo.

"Gee Boy," having completed 100 hours flying time, is now having its overhaul, and will be ready for the air again within a few days.

Lancashire Aero Club

Report for week ending October 8.—Bad weather, staff holidays and Manchester Civic week cut down the available flying period to 3½ days. Total time for week, 33 hrs. 45 mins., made up as follows :—

Dual with Mr. Stack :—Leigh, Crosthwaite and Lilley, 20 mins. each.

Dual with Mr. Cantrill :—Abdulla, 1 hr. 10 mins ; Nelson, 50 mins. ; Anderson, 45 mins. ; Birley, 40 mins. ; Cowan, Smith and Goodyear, 30 mins. each ; Stern, 25 mins. ; Banes, Leigh, Newton, S. Birley, Wade and Bladgen 20 mins. each ; Hope, Cohen and Slayden, 15 mins. each ; Hampson, 5 mins,

Dual with Mr. Scholes :—Nelson, 40 mins.

Solo and/or with passengers :—Stack, 4 hrs. 15 mins. ; Leete, 3 hrs. 50 mins. Leeming, 2 hrs. 30 mins. ; Costa, 2 hrs. 25 mins. ; Lacayo, 1 hr. 40 mins. ; Scholes and Agar, 1 hr. 25 mins. each ; Cantrill, 1 hr. 20 mins. ; Hampson, 35 mins. ; Goodfellow, 1 hr. ; Michelson, 30 mins. ; Hardy, 20 mins. ; Williams, 15 mins.

Joy-rides :—Mrs. Jones, Mrs. Baley, Miss Nuttall, Miss Littley, Messrs. Irwin, Birley, Corbishley, Lacayo, Williams, Leeming, Mathews and Chapman.

Tests occupied 2 hrs. 10 mins.

In connection with his Civic reception at Manchester, Sir Alan Cobham landed at Woodford on Thursday, where he was entertained by Avro's and the club, and subsequently escorted to the emergency landing ground in the city by a formation of club machines (two Moths, piloted by Cantrill and Scholes, and the Avro Gosport, piloted by Goodfellow). It will be noted that the Gosport has been "tamed" ; the Renault-Avro went unserviceable at the last minute, so Mr. Goodfellow promptly took the air on the Gosport, with the aid of about 3½ cylinders and plenty of confidence. He reported subsequently that the engine was really an unnecessary luxury anyway as, once off the deck, the Gosport will *fly* entirely on its reputation.

Midland Aero Club, Ltd.

Report for week ending October 9 :—The flying time was 5 hrs. 27 mins. The following members were given dual instruction : S. H. Smith, J. Brinton, A. B. Gibbons, H. Smith. The following members made solo flights : R. L. Jackson, E. R. King, G. V. Perry, E. J. Brighton, J. Brinton. On Sunday Mr. E. R. King made the necessary qualifying tests for his "A" licence.

The Club has now completed one year's operations as one of the six flying clubs approved by the Air Ministry. The distinction of having been the first provincial aero club in this country belongs to the Midland Aero Club, which was founded as far back as September 3, 1909, with a membership of 25. Those who remember the early days of flying will recall that the club organised and carried to a successful issue the first All-British aviation meeting at Dunstall Park, Wolverhampton, in 1910.

With the advent of the 1914–18 War club activities practically ceased, but with the inauguration of the Air Ministry light aeroplane scheme interest soon revived.

During the past year two D.H. 60's have provided the flying material : G-EBLT has done 215 hours and G-EBLW has done 248 hours, which represents a total mileage flown of about 33,000.

It is very satisfactory to be able to place on record the fact that there have only been five forced landings—one from mechanical defect, three from loss of direction, and one through the pilot stopping the airscrew in the air.

The damage to aircraft during the year has been exceedingly small—two under-carriage bracing cables, one under-carriage radius strut, and two airscrews. One airscrew was broken through the aeroplane colliding with a reaping machine while taxying, and the other as a result of running into a hedge after a forced languing in a small field ; in each case the machines were in the hands of pupils. This entire absence of any serious crash reflects considerable credit on the high standard of the instruction given by Capt. McDonough, who has been solely responsible for all the instructional work, and Mr. W. J. Halland, whose excellent aircraft maintenance has always been at a very high level.

The Newcastle-upon-Tyne Aero Club

Flying report for week ending October 10.—Gales, rain and magneto troubles have curtailed the amount of flying which might have been possible in view of the large attendances of members throughout the week. Total flying time, 23 hrs. 20 mins. Dual, 13 hrs. 25 mins. Solo, 5 mins. "A" Pilots, 8 hrs. 55 mins. Tests, 10 mins.

The following members flew under instruction with Mr. Parkinson :—Mr. J. D. Irving, Miss C. R. Leathart, Mr. J. M. Kennedy, Mr. E. C. Kennedy, Mr. J. N. Charlton, Mr. R. Whitfield, Mr. D. Matthews, Mr. M. Bainbridge, Mr. H. Ellis, Mr. J. D. Bruce.

The following members flew solo and with passengers :—Mr. C. Thompson with Mrs. Heslop ; Mr. W. Baxter Ellis with Mrs. Ellis, Mr. R. N. Thompson ; Mr. F. H. Phillips with Mrs. Anderson ; Dr. H. L. B. Dixon with Dr. Hume ; Lord Ossulston with Mrs. W. B. Ellis and Mr. Whitfield.

Mr. Warner and Councillor W. B. Ellis flew with Mr. Parkinson.

On Monday Lord Ossulston with Mr. Whitfield as passenger in one machine, and Mr. F. H. Phillips in the other, flew to Chillingham Castle, landed for tea and returned to the aerodrome.

On Friday, Mr. Heppell and Lord Ossulston left the aerodrome at 7 a.m., flew to Chillingham, where they landed. Later they flew to Edinburgh. Mr. Heppell returned alone, making the journey in 58 minutes.

On Thursday Mr. H. Ellis made his first solo flight, which was a very creditable performance with an excellent landing.

SIR ALAN COBHAM'S BUSY WEEK

SINCE the conclusion of his historic England-Australia-England flight, Sir Alan J. Cobham has been, as might be expected, spending a busy time attending official and civic functions, giving lectures, etc. We have already referred, in last week's issue of FLIGHT, to the luncheon given in his honour by Sir Chas. Wakefield, and the official Air Council luncheon, held on October 4 and October 5 respectively, and so we need not dwell further on these two functions, but will pass on to Sir Alan's subsequent activities.

On October 7 Sir Alan attended a reception at Manchester, in connection with that city's Civic Week. As originally planned, he was to fly from London to Manchester in a D.H. "Moth," arriving in time to attend a luncheon given in his honour by the Lord Mayor at the Town Hall. Sir Alan left Stag Lane aerodrome at 9.50 a.m., and all went well until near Nuneaton, when a sooted plug necessitated a forced landing. This was accomplished in a field near Hinckley, some overhead electric cables carrying some 6,000 volts, just missing the machine. It was then discovered that the tool kit was conspicuous for its absence, and even if they could have removed the faulty plug, there was no spare one to replace it! As a result, Sir Alan, after walking several miles trying to find the necessary means of repair, had to telephone for another machine, and when this arrived he proceeded on his journey.

In the meanwhile, about half the population of Manchester had turned out to give him welcome at Woodford, Withington (the two aerodromes where he would land) and Albert Square, outside the Town Hall, and much disappointment was caused by his non-arrival at the appointed hour. Eventually, however, Sir Alan arrived safely at Woodford (the headquarters of the Lancashire Aero Club) at 2.40 p.m., where he received a hearty welcome. Proceeding after a brief interval, he arrived at the Withington landing ground at 3.54 p.m., whence he hurried to the Town Hall—too late, of course for the lunch prepared in his honour. A most enthusiastic reception was accorded him by the huge crowd, which had waited patiently for his arrival, and after being warmly received by the Lord Mayor, Sir Alan made a brief speech to the crowd outside the Town Hall.

As Sir Alan explained to the Lord Mayor, he could fly to Rangoon, etc., through all sorts of things without any trouble, but he was unable to do a few miles in his own country! During the course of his speech, Sir Alan said that in Mr. A. V. Roe the city possessed the man who had designed the first aeroplane that ever flew, and upon whose design the whole industry was based, and he appealed to the citizens to take the lead in the aircraft industry, which, he prophesied, would one day be as great as, if not greater than, the motor-car industry. At present other countries were going ahead faster than we were, and it would be a bad day unless we regained our lead.

On October 8 Sir Alan was the guest of honour at the monthly luncheon of the Overseas League at the Criterion Restaurant, at which Air Vice-Marshal Sir Sefton Brancker presided. Referring to Sir Alan's flights, the Chairman pointed out that, unlike other big flights made by foreign airmen, Sir Alan had, with one small exception, got all the necessary money raised privately. Sir Alan, in responding, emphasised the fact that the whole journey to Australia and back was never interrupted through any fault of the aeroplane or engine, which went to prove, as did the figures of the various Imperial Airway transport lines, that we had come to a stage in aviation where mechanical failure was no more apparent than in any other form of transport.

That evening (October 8) Sir Alan and his companions were honoured at dinner by the Institute of Aeronautical Engineers at Kettner's Restaurant, Lieut.-Col. J. T. C. Moore-Brabazon presiding. In the course of his speech in reply to the toast of his health, proposed by the Chairman, Sir Alan paid a tribute to the work of Sergt. Ward and Mr. Capel, who had, he believed, kept his D.H. 50 in a probably better condition than any other machine ever had been kept. He added that he contemplated no more long flights for the time being, but he hoped, however, to continue to assist aviation in every way he possibly could.

Lord Thomson of Cardington (a former Secretary of State for Air) proposed the toast of "Civil Aviation," and Sir Sefton Brancker, Director of Civil Aviation, replied.

The proceedings were brought to a close with the toast of "Our Chairman," proposed by Mr. Lawrence A. Wingfield, Honorary Solicitor of the Institution.

Other guests included, in addition to Sergt. Ward and Mr. Capel, General Guidoni (Italian Air Attaché), Captain and Mrs. Tymms, and Mr. and Mrs. R. A. Loader.

Sir Samuel Hoare sent an expression of regret at being unable to attend, and a telegram was received from Sir Charles Wakefield to the same effect.

After dinner the guests adjourned to the restaurant, where dancing until 2 a.m. brought a highly enjoyable and interesting occasion to a close.

On Sunday evening Sir Alan gave his first public lecture since his return home at the Royal Albert Hall. Air Vice-Marshal Sir Sefton Brancker introduced the lecturer, and in doing so said he believed that history repeated itself—in Queen Elizabeth's time distinguished pioneers accomplished great things on the seas, and now they had started to build up the great air force of the future.

Sir Alan then gave the full story of his flight to Australia and back, the complete route traversed and certain places referred to during the course of the lecture being indicated by means of a large map placed behind the lecturer.

Sir Alan was among the visitors at Buckingham Palace on October 11, when he was received by the King, who bestowed upon him the accolade of knighthood. His Majesty had a long talk with Sir Alan about the flight to Australia and back.

The Hon. W. G. Gibson, Postmaster-General of the Commonwealth of Australia, has written to Sir William Mitchell-Thompson, the British Postmaster-General, recording, *inter alia*, his appreciation of Sir Alan J. Cobham's wonderful flight out to Australia. The letter was a reply to one from Sir William Mitchell-Thompson, which was carried by Sir Alan on his outward flight. It was conveyed on the return flight to this country, and has been duly delivered to the Postmaster-General.

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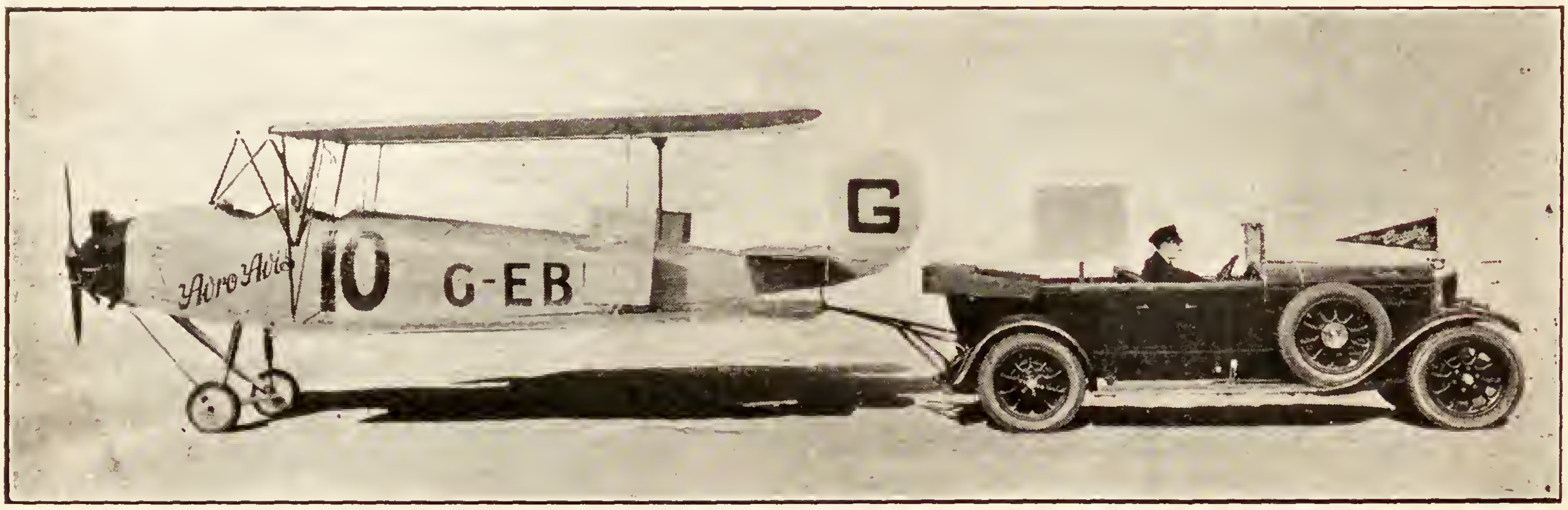

NOT A TUG-OF-WAR: This is not a tug-of-war between rivals in transport, but one of the features in the Transport Parade held in connection with the Manchester Civic Week. The Avro "Avis" light 'plane towed by the 18-50 h.p., six-cyl. Crossley car created a good deal of interest.

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THE actual D.H. Type 50 Seaplane on which Sir Alan J. Cobham has just completed his wonderful flight of 28,000 miles to AUSTRALIA AND BACK has now covered 125,000 miles, including
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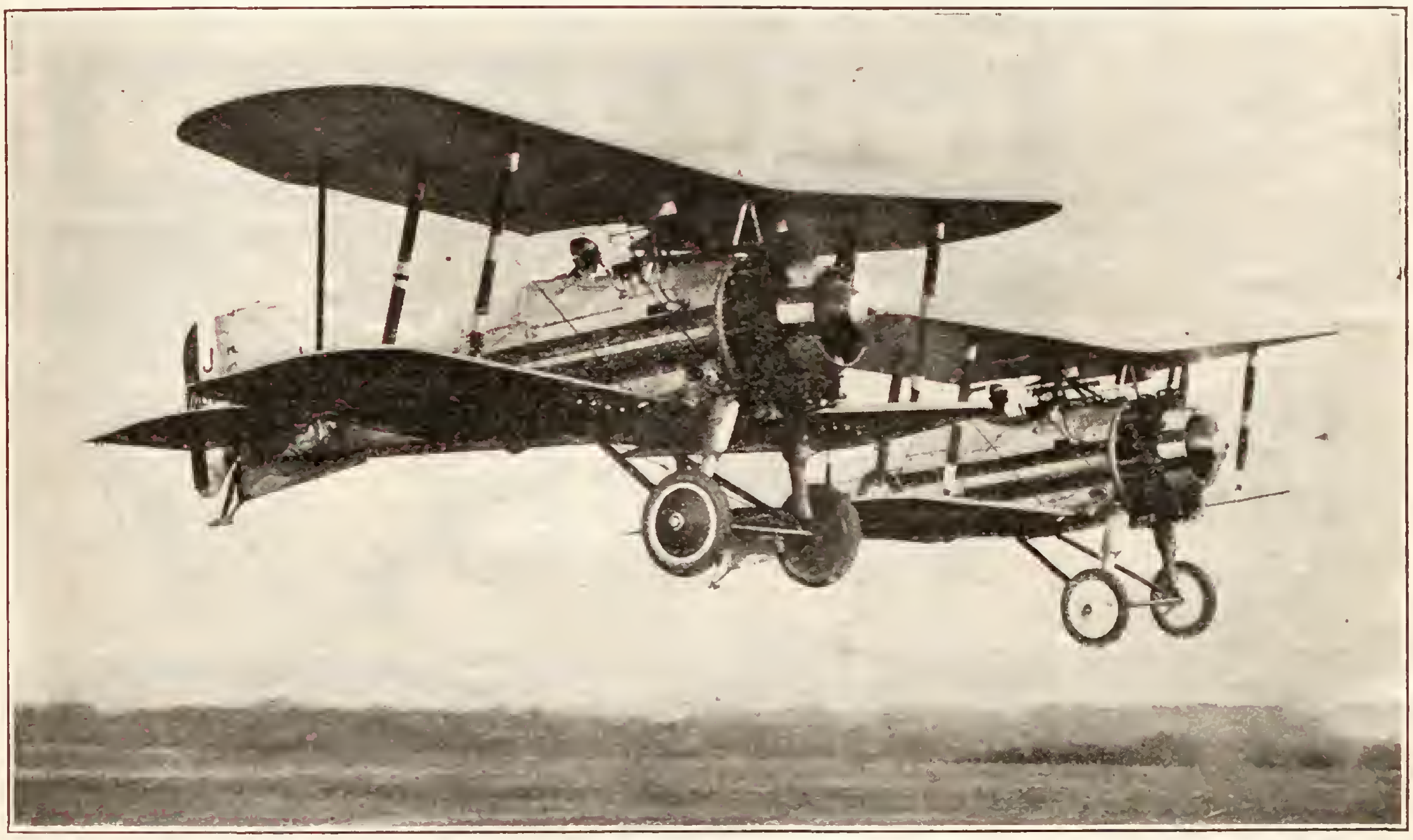

[“Flight” Photo.

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ROYAL AERONAUTICAL SOCIETY NOTICES

New Chairman.—Colonel the Master of Sempill, A.F.C., Associate Fellow, assumed office as Chairman of the Society for the year 1926-1927 on October 1.

Lecture Session.—The following programme of lectures has been arranged for the first half of the Session, 1926-1927 :—

Thursday, October 7, at 8.30 p.m.
Colonel the Master of Sempill, A.F.C.
"Aero Engine Fuels of Today and Tomorrow."

Thursday, October 21, at 6.30 p.m.
Mr. W. R. D. Jones, M.Sc.,
"Notes on Magnesium and Some of its Alloys."

Thursday, November 4, at 7.0. p.m. (Joint Meeting with the Institution of Automobile Engineers).
Mr. G. F. Mucklow.
"Hydrogen as an Auxiliary Fuel for a Solid Injection Engine."

Thursday, November 18, at 6.30 p.m.
Mr. R. S. Capon.
"Methods of Performance Testing and Analysis."

Thursday, December 2, at 6.30 p.m.
Mr. P. B. Henshaw.
"Alloy Steels for Aero Work."

Thursday, December 16, at 6.30 p.m.
Wing-Commander C. D. Breeze, A.F.C., R.A.F.
"The Training of Aircraft Apprentices."

Elections.—The following have been recently elected in the various grades of the Society :—

Fellow : Mr. E. F. Relf.

Associate Fellows : Mr. J. H. Crowe, Mr. A. S. Halliday, Mr. D. A. Hughes, Captain A. G. Lamplugh, Mr. J. C. Stevenson, and Flt.-Lieut. E. J. D. Townesend.

Associates : Mr. J. E. Atkins, F./O. E. St. M. Brett, Mr. H. V. Bullbrook, Mr. O. P. H. Denyer, Mr. L. W. Dove, Mrs. Eliott-Lynn, Flt.-Lieut. V. P. Feather, F./O. C. A. C. Fidler, Mr. C. H. Prewer, Mr. W. G. Gibson, Mr. T. Hampson, Mr. H. R. Haynes, Flt.-Lieut. P. G. Leigh, Mr. P. H. Lindley, Mr. F. A. I. Muntz, Mr. W. J. Plater, Flt.-Lieut. R. C. Preston, F./O. O. T. P. Prickman, Mr. J. B. Prior, Mr. F. Radcliffe, Mr. W. Ramsay, Mr. G. C. D. Russell, Mr. D. G. Snook, Lieut. the Hon. J. M. Southwell, R.N., F./O. J. F. Tadman, Mr. A. V Tarlton, and Mr. L. D. Whistler.

Students : Mr. E. J. Fearn, Mr. P. T. Capon, and Mr. C. D. Perrickos.

Members : Mr. E. A. Berens, Col. C. de F. Chandler, Sir Robert Waley Cohen, The Master of Elibank, Mr. N. Norman, and Mr. R. C. Tragett.

Lecture.—The second lecture of the first half of the sixty-second session will be held on October 21 at 6.30 p.m., at the Royal Society of Arts, 18, John Street, Adelphi, W C. 2, when Mr. W. R. D. Jones, M.Sc., will read a paper entitled "Notes on Magnesium and Some of Its Alloys." Colonel the Master of Sempill, A.F.C., A.F.R.Ae.S., will take the chair.

Associate Fellowship Examination.—The Society's fourth examination for Associate Fellowship took place on September 21. One candidate only, Mr. J. C. Dodds, was successful in both papers submitted.

J. Laurence Pritchard.
Honorary Secretary.

AERO ENGINE FUELS OF TODAY AND TOMORROW

A paper under above title was read before the Royal Aeronautical Society on October 7 by Colonel the Master of Sempill, A.F.C., A.F.R.Ae.S. Unfortunately it is not possible for us to give the paper in full, it being one of quite exceptional length, nor does the paper lend itself to summarising. The lecturer dealt with his subject in a most thorough manner, going back as far as the Bible (Genesis ix, 3) for his earliest records of petroleum products (in connection with the Tower of Babel the statement is found "Slime had they for mortar," the slime being bitumen). In the course of his very interesting paper Colonel Sempill dealt with petroleum supplies, Scottish shale oil, coal by-products, power alcohol, and their various forms and sub-divisions. Reference was also made to dopes and detonation. In conclusion, the lecturer stated that no startling or sudden changes in the basic fuels used to-day could be visualised in the immediate years to follow. "It is considered," he concluded, "that the fuels of the immediate future will be the same as those used to-day, but the source of supply will of course be considerably augmented, and alcohol, as yet playing a negligible part, will come into greater use. The principal factors that will enable the attainment of desired results that have been briefly outlined above are the following, and in their fulfilment lies, in the writer's humble opinion, a forecast of the fuel position of the immediate future :—

"(*a*) The extension of research on engine design, not only from the point of view of improvements in design, but from the point of view of the bearing such work will have on the use of fuels other than petrol and the like, and the relation of same to the points below.

Land's End to John O'Groats in a "Moth" : Colonel the Master of Sempill enjoys a refreshing cup of tea after his recent flight from Land's End to John O'Groats in the King's Cup D.H. "Moth" G-EBMO. He covered the 630 miles in 8 hrs. 14 mins., making a brief halt at Shotwick en route.

"(*b*) The discovery of a dope that will suppress detonation when added to fuels in small quantities. Such a substance should be readily available in the quantities required, and at an economic figure. It must be free from all deleterious effects and should for preference be a non-metallic substance.

"(*c*) The extension of cracking as a means of yielding more light fuel, particular attention being given to such factors as control the H.U.C. value of the ultimate product.

"(*d*) The extension and improvement of existing means of winning the light fuels produced in the various processes to which coal is subjected, and the legitimate encouragement of such systems as will enable coal now consumed in the raw state to be treated and utilised more economically.

"(*e*) The creation, where economically possible, of methods for the supply of alcohol by means of fermentation, or synthetically."

◆ ◆ ◆ ◆

PERSONALS

Married

The marriage took place on October 9, at Christ Church, Esher, of Flying-Officer Gerald Armstrong, R.A.F., son of the late Lieut.-Col. Armstrong, D.S.O., and Mrs. Armstrong, of Dunkirk House, Devizes, and Miss Alexia Mary Frances Barré Phipps, daughter of Mr. and Mrs. Barrè Phipps, of St. Nicholas, Esher, Surrey.

On October 5, at All Souls', Langham Place, by Air Commodore H. Viener, C.B.E., Chaplain-in-Chief of the R.A.F., Lionel Collins Beaumont, eldest son of Mrs. Beaumont and the late Capt. D. S. Beaumont, of Guernsey, was married to Enid Corinne, younger daughter of Mr. and Mrs. Horace H. Ripley, of "Outwood," Surrey.

Squadron-Leader H. V. Champion de Crespigny, M.C., D.F.C., A.F.C., was married on October 7, at St. George's Church, Fovant, to Sylvia Ethel Usher, second daughter of Rev. R. and Mrs. Usher.

To be Married

A marriage has been arranged, and will shortly take place, between Flight-Lieut. Denis H. Carey, R.A.F. only son of Capt. Walter Carey, C.B.E., R.N., and Mrs. Carey, of Melrose, Winchester, and Ferelyth, elder daughter of Mr. and Mrs. Seymour Wakeley, of Rainham, Kent.

A marriage has been arranged, and will shortly take place, between Sir Reginald Leeds, Bt. (late R.N. and R.A.F.), elder son of the late Mr. W. H. A. St. J. Leeds, I.C.S., and Mrs. J. H. McNeale, of The Red Roofs, Cheltenham, and Winnaretta, only daughter of Mr. Paris Singer, of 1 bis, Place des Vosges, Paris, and Mrs. Graham Singer, of 1, Ovington Square, S.W.

The engagement is announced between Flight-Lieut. Richard S. Topham, R.A.F., Medical Service, the only son of the late Dr. A. S. Topham and Mrs. Topham, of Halifax, Yorkshire, and Marçorie, eldest surviving daughter of Mr. and Mrs. Roland B. Chessum, of Enfield, Middlesex.

The engagement is announced between Flight-Lieut. E. F. Turner, A.F.C., R.A.F., youngest son of Mr. and Mrs. Alweyne Turner, of Eastbourne, and Margaret Elizabeth, daughter of Mr. and Mrs. Richard Garratt, of Holywood, Co. Down.

Item

The will of the late Arthur Buller Elliott, of Strathaven House, Brent Street, Hendon, N.W., who had accompanied Mr. Cobham on his flight to Australia, and who died during that journey in the R.A.F. Hospital at Makina, Basra, on July 6, from gunshot wounds received while in flight over Mesopotamia, has been proved at £1,453.

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"COPPA d'ITALIA": The Trophy presented by the Italian Air Ministry for the International Light 'Plane Meeting which, under the organisation of the Aero Club of Italy, is being held near Rome on October 10.

The Royal Air Force Memorial Fund

The usual Meeting of the Grants Sub-Committee of the Fund was held at Iddesleigh House, on October 7.

Lieut. Commander H. E. Perrin was in the Chair, and the other Members of the Committee present were :—Mrs. L. M. K. Pratt-Barlow, O.B.E., Mr. W. S. Field.

The committee considered in all 15 cases, and made grants to the amount of £335 4*s*. 6*d*.

The next meeting was fixed for October 21, at 2.30 p.m.

Royal Air Force Flying Accidents.

The Air Ministry regrets to announce that Flying Officer Philip Hedgeland Nicholls died on October 5, as the result of injuries sustained on October 1, in an accident at Peshawar, India, to a Bristol Fighter of No. 20 Squadron, Peshawar. Flying Officer Nicholls was the pilot of the aircraft. His passenger, No. 347556 L.A.C. George Cairns, received only slight injuries.

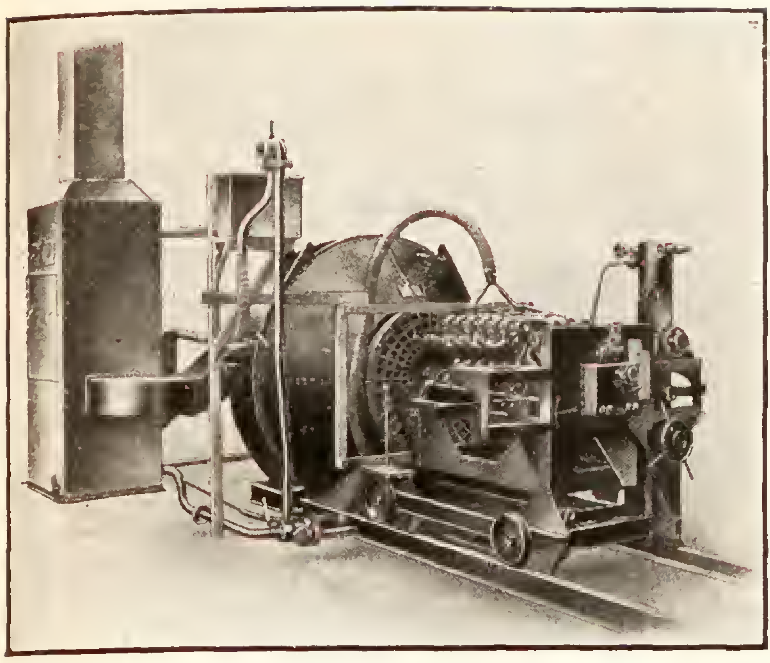
As the result of an accident at Kenley, Surrey, to a Grebe aeroplane of No. 56 squadron, Biggin Hill, Kent, on October 8, No. 312488 S.M.I. Erik Gutzeit Haug, the pilot and sole occupant of the aircraft, was killed.

Institute Aeronautical Engineers

On October 26, Mr. G. H. Dowty, A.F.R.Ae.S. (Member), will read a paper on "Aircraft Alighting and Arresting Mechanisms," before the Institution. The meeting will be held in the Lecture Room of the Junior Institution of Engineers, 39, Victoria Street, S.W.1, at 6.30 p.m., and all who are interested will be welcome to attend.

Sir Samuel Hoare and Trade Development

Sir Samuel Hoare, Secretary of State for Air, presided at the inaugural lecture of the cultural studies and handicraft classes, organised for the staff of the Air Ministry, on October 11. In his opening address Sir Samuel said the lectures seemed to him to provide one of many answers to the charges that were often made quite ignorantly and irresponsibly against Civil servants, that they worked less than other people and were less interested in things happening outside their own department. Here they had a case of a great Government department showing its many interests, not only in the day's work of the department, but in the other great subjects outside, and showing it in an increasing degree every year. Over 300 members of the department, including many R.A.F. officers serving in the Air Ministry, have enrolled for these courses. The first of the lectures, "Trade and Travel in the Middle Ages," was given by Dr. Eileen Power, M.A., D.Lit., of London University.



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King's Cup

won by De Havilland (Moth) 27/60 h.p. "Cirrus" engine, piloted by Capt. H. S. Broad, entered by Sir Charles Wakefield, Bart. Won on *PRATTS*

President's Cup

Inter-Club Members' Scratch Race and Bomb-Dropping event, at the Newcastle Aero Club's Meeting—all won on *PRATTS.*

York Aero Challenge Cup

won at the Leeds Aerial Pageant by Mr. J. Parkinson, flying a D.H. Moth (27/60 h.p. Cirrus engine), entered in Pilot Instructors' Race—on *PRATTS.*

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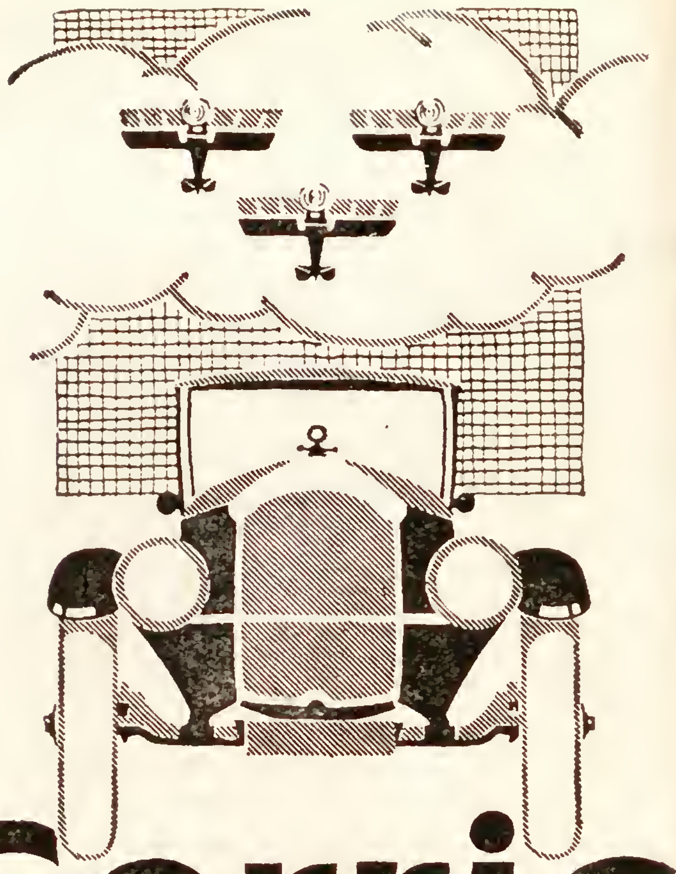

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FROM THE FOUR WINDS

French Ambulance 'Plane Crash

A French ambulance 'plane, conveying an injured man, crashed at Ain Dorig, in Morocco, yesterday. The wounded man and the mechanic were killed and the pilot was injured.

German 'Planes on London-Amsterdam Route

In order that Imperial Airways, Ltd., may concentrate on the Paris and Cologne air routes, an arrangement has been made between this company and the German Luft Hansa Company whereby the latter will, for the future, operate the London-Amsterdam route with their Junkers machines, in connection with the Berlin-Hanover service. The Imperial Airways machines will, therefore, be withdrawn from the London-Amsterdam route.

French Flight to Madagascar

Two French seaplanes, piloted by Lieuts. Bernard and Guibbaud, and each accompanied by a mechanic, left Marseilles on October 12 for Madagascar. It is intended that they should follow the west coast of Africa to Senegal, thence via rivers and lakes across Africa to Mozambique. The object of the flight is to test the value of seaplanes as a means of communication between the French colonial possessions.

Lord Sholto Douglas and Mrs. Pickles Married

On October 11 Lord Sholto Douglas was married at the Registrar's Office at Staines to Mrs. Lily Louise Pickles, mother of our old friend and Hendon pilot of early days, Sidney Pickles.

Czechoslovak Aeronautical Scholarships

Three scholarships to enable the holders to study aviation at the Paris School of Aircraft are being offered by the Czechoslovak Ministry of Public Works. Each is for a term of two years. Among the conditions the holders must undertake to serve, if required, for a term of five years in some air service in Czechoslovakia on conclusion of their studies in Paris.

Aircraft-Carrier "Hermes" at Hong-Kong

H.M. aircraft-carrier "Hermes" arrived at Hong-Kong on October 11.

The "Cobham D.H.50" and "Bart's"

The D.H.50J (Siddeley "Jaguar") seaplane, on which Sir Alan Cobham made his England-Australia-England flight, formed, minus its wings, an attractive exhibit in the "Fleet Street Week for Bart's" procession which toured the City of London streets on Saturday last.

Brussels-London Air Liner's Forced Landing

One of the Imperial Airways air liners, *en route* from Brussels to London, had to make a forced landing in a wood at Peteghen (near Deynze) on October 10. In landing the machine came to grief in a ditch and was badly damaged, but the passengers and pilot were unhurt, the former being taken by car to Ostend, whence they proceeded to Dover by boat.

R.A.F. Operations near Persian Gulf

R.A.F. aircraft have been engaged in a punitive expedition against a small section of the Shammer Arabs, as a result of a raid on a village in the Kuweit territory (Persian Gulf).

Schneider Cup Pilot Killed

From Varese it is reported that the Italian pilot Marchese Centurione was killed at the Schiranna air station, on September 21, while testing one of the Macchi 39 racing seaplanes designed for this year's Schneider Cup Race in America. It appears that during a turn the machine side-slipped and crashed into the sea, although the pilot is said to have succeeded in righting it just before it hit the water. Another machine of the same type had previously been successfully tested by Signor Sartori.

Death of Dr. Lhota

It is with sincere regret that we record this week the death, as a result of an aeroplane accident, of Dr. Lhota, the famous Czechoslovak pilot, Dr. Lhota, it appears, was flying one of the Avia monoplanes for the Coppa d'Italia at Rome when he crashed. By his death Czechoslovakia has lost one of her foremost pilots, and certainly her chief exponent of the value of light 'planes. Dr. Lhota, it may be remembered, won first prize in the recent light 'plane meeting at Orly, near Paris.

A Soviet Airship

It is reported from Sebastopol that the first Soviet airship is almost ready for test. This airship, of the non-rigid type, is said to have been designed at the School of Aerial Navigation in Leningrad, and to have a capacity of 2,500 cub. m. It is to carry a crew of four.

Dornier "Super-Wal" tested

A few days ago the new Dornier flying-boat, known as the "Super-Wal," was tested at Friedrichshafen by the Dornier pilot Wagner. This machine, which is to carry 25 passengers, is equipped with two Rolls-Royce "Condor" engines.

The Taylor Gold Medal

The Council of the Institution of Aeronautical Engineers has awarded to Capt. W. H. Sayers the "Taylor Gold Medal" for the session 1925-26 for his paper entitled "The Modern Theory of Aerofoils and its Application to Aircraft Design."

Australian Pacific Flight

Continuing the survey flight to the Pacific islands, Group-Capt. R. Williams, Chief of Australian Air Staff, left Gladstone, on October 6, in the Supermarine "Seagull," and, making a brief stop at Mackey, flew to Bowen. On October 8 Cooktown was reached, and by Sunday (October 10) he got as far as Thursday—the island, not the day of the week! He left for Port Moresby, New Guinea, on October 11.

Imperial Airship Progress

Steady progress is being made with the Imperial Airship service scheme. One girder of the 5,000,000 cub. ft. airship R. 101 has been completed and certain preliminary tests have successfully been carried out. These girders are being constructed of stainless steel, and it may be mentioned that the metal components for this airship are being constructed by Messrs. Boulton & Paul who have considerable experience in metal construction for aircraft. As regards the other side of the scheme, on October 9 the first piece of steel structural work for the new airship shed at Karachi was hoisted into position in the presence of a large number of people, including many distinguished guests. The ceremony was performed by Mrs. T. C. Frampton, the wife of the agent of the Armstrong Construction Co.

End of Berlin-Peking Survey Flight

After an absence of over two months the two Junkers G.23 three-engined monoplanes of the Deutsche Lufthausa air transport company, which have been surveying the route to be followed by an air service between Berlin and Peking, have returned to Berlin. The expedition has reported favourably on such a service, although a considerable amount of work will have to be done before the service can get going.

The Brothers Arrachart at it again

An unsuccessful attempt at beating the existing world's record for non-stop flight in a straight line was made recently by the brothers Arrachart, the famous French pilots. Starting from le Bourget in a Breguet 19 with 550 h.p. Renault engine at 2 a.m. (*i.e.*, in total darkness) on September 28, a following wind helped them along for the first part of their journey, but gradually the visibility became very bad, and in Russia the weather was quite impossible, so that ultimately it became necessary to alight in the province of Ekaterinenburg, on the Siberian frontier. The distance covered was in the neighbourhood of 4,000 km. (2,500 miles).

Paris-Corsica-Paris

On September 30 two French aviators, Sergt. Duteriez and Lieut. Vitrolles, flew, in a Breguet 19A2, from le Bourget to Corsica (where photographs were taken to prove the attainment of that island) and back to le Bourget in a day, the distance covered being in the neighbourhood of 2,000 km. (1,240 miles).

Aeroplanes! Yes, Sir, this Way

The first Aeroplane Show Rooms have just been opened in New Bond Street. Here the prospective buyer, or flier may inspect the latest model (full-size) aeroplane, and have all its features and qualities explained by an enthusiastic, well-groomed, "aero-salesman," just in the same way as that obtaining in the familiar motor-car showrooms. The machine so displayed in this new show room is a D.H. "Moth," and already many people have "looked in" to make inquiries. It looks as if soon some of our big "stores" will be having an aeroplane bargain basement on the roof.

THE INTERNATIONAL LEAGUE OF AVIATORS

Mr. Clifford B. Harmon, as Founder and President of the I.L.A., at a luncheon at the Savoy Hotel last week, explained the why and wherefore of the Association which he has very much at heart. Mr. Harmon was introduced by Lieut.-Col. Edwards who presided in the absence of Air Vice-Marshal Brancker. Mr. Harmon, he reminded the guests, was one of the earliest in aviation to qualify in piloting —as far back as 1910—then creating many records in America and therefore must be recognised as one of the pioneers in aviation. Mr. Harmon, he said, possessed the vision that the final end of commercial aviation must be International companies or corporations, although the composing units would naturally be in competition with each other, to the benefit of aviation, and he thought commercial aviation would ultimately take the place of the League of Nations. It was this future which was at the back of his mind when he founded the I.L.A., and of which there were already branches founded abroad.

Mr. Harmon said he was trying to establish the I.L.A. all over the world. In France it had been growing, and he hoped that Great Britain would be one of its greatest hopes. Only aviators could join who held certificates entitling them to call themselves pilots. It was started four months ago and already 14 countries had signified their willingness to come into the League. King Albert of Belgium, as Hon. President, had become the Grand Patron of their new venture and he hoped to have General Brancker as their English President. The League sought to benefit aviators by companionship and provided many and diverse privileges for those joining up, and the cost was only 2*s.* to belong. The President of each country selected his own officers to attend the regular meetings of the League and to control the management. They had their own little insignia. They were trying to form posts in every country where the courageous young aviators could hang up their hats and become one of a great family. Trophies would be awarded for meritorious work, and another proposal was the adoption into good families of the children of aviators who had lost their lives. Each branch had been presented with a bronze statue for the best piece of work during the year by an airman, whether Member of the League or not—besides another Trophy. In Paris a big fête was being organised of which one-third of the ticket sales would go to the Ace of Aviators, whoever may be decided upon, and two-thirds to the League funds. Ten children of aviators who had lost their lives were to be sent to the United States to be adopted and educated and looked after for launching upon life. Admiral Mark Kerr responded for the guests.

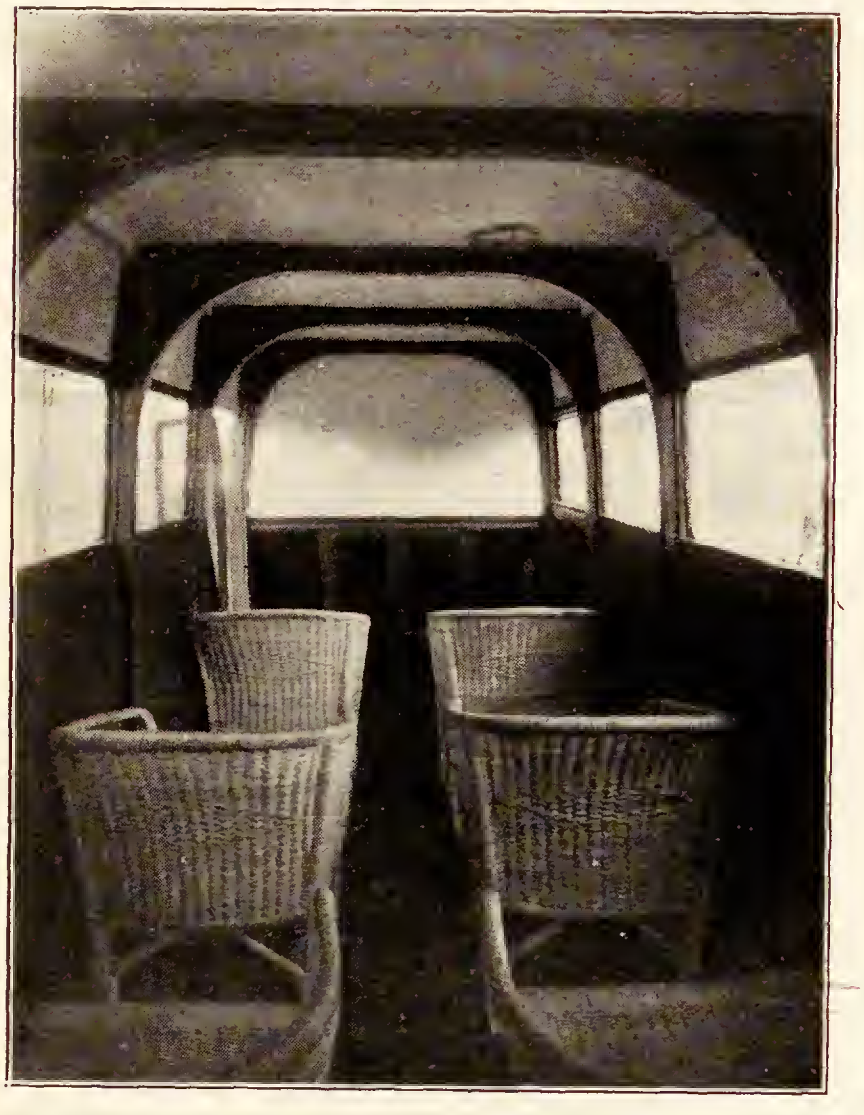
* * *

Schneider Cup Race Postponed

The contest for the Schneider Cup race, originally fixed for October 24, has been postponed to November 11.

The Cruise of the "Southamptons"

It is always of interest to hear how certain components behave during the big performances carried out by aircraft from time to time. For instance, Cellon (Richmond) Ltd., have received from the Supermarine Aviation Works, Ltd., a report regarding the "Cellon" dope used on the two Supermarine "Southamptons" flying-boats which recently carried out a very successful flight to Egypt and back. The report says:—" Since the return of the two 'Southampton' type machines . . . we have had an opportunity of examining the condition of these machines after their strenuous service in very varying atmospheric conditions. We feel sure you will be both interested and pleased to know that the condition of the fabric on both machines is in first-class order, its original tautness being still retained, which is a proof of the excellence of your dope as these machines were never placed under cover from the time they left England until they returned, and at all stopping places were moored out in the open under constantly varying conditions."



PASSENGER CARRIER FOR AUSTRALIA: View inside the cabin of the A.N.E.C. III, which was described and illustrated in "Flight" for Feb. 11, 1926.

U.S. Air Attachés in Aeroplane Crash

On September 21 last Maj. C. L. Tinker, Assistant Army Air Attaché at the U.S. Embassy, and Commander R. A. Burg, Assistant Naval Air Attaché, were involved in an accident whilst carrying out a practice flight near Kenley on an American-built D.H.4c (Liberty). The engine failed shortly after taking off, and the machine collided with some trees and crashed to the ground, immediately bursting into flames. Maj. Tinker managed to get free and assist his companion from the burning machine. Both were severely burned and injured, and were conveyed to Purley Hospital, where Commander Burg died as a result of his injuries on September 26. Maj. Tinker is progressing satisfactorily.

British-Made Magnetos

A large party of Press representatives and others spent a very interesting afternoon recently going through the magneto works of the British Thomson-Houston Co., Ltd., at Coventry. At the preceding luncheon given by the directors of the company, reference was made to the fact that previous to 1914 there was for all practical purposes no magneto industry in this country; the two factories of the B.T.-H. Co. in Coventry showed that there is now a very extensive and healthy industry, especially when it is remembered that there are several other factories busily engaged in magneto making.

While the rotating armature type of magneto is still mostly in demand, the call for the polar-inductor type, especially for aeroplane and other high-speed engines, is steadily increasing. In this department the B.T.-H. Co. is remarkably well equipped, as it has been engaged on this type since the early days of the war. For high-speed engines the B.T.H. polar inductor has many advantages, the most important being that it can very conveniently be made as a four-spark machine, whereas the rotating armature magneto is essentially a two-spark machine. Another interesting development of recent years is an automatic timing device, which, of course, is greatly in demand for car work.

The B.T.-H. Co. has recently turned its attention to producing a lighting and starting set for cars, which has given very fine results.

In the matter of moulded insulations, which play a very important part in the magneto industry, the B.T.-H. Co. has established plant which is one of the largest and most up-to-date installations in the country. This moulded insulation is known as "Fabrolite," and it leaves the mould with such a highly polished finish that no finishing operations are required.

In addition to its use for moulded insulations, another important industrial application of "Fabrolite" is in the production of "Fabroil" silent timing gears.

Sir Alan Cobham's flight to Australia.

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THE ROYAL AIR FORCE

London Gazette, October 5, 1926

General Duties Branch

Group Capt. A. B. Burdett, D.S.O., is apptd. Deputy Director of Organisation, Air Ministry, vice Group Capt. R. P. Mills, M.C., A.F.C. (Sept. 21).

The follg. Flying Officers are granted permanent commissions in this rank :—A. A. Jones (Aug. 1) ; D. S. Brookes, J. W. Colquhoun, H. I. Cozens, A. F. Hutton, R. O. Jones, J. B. Lynch, O. R. Pigott (Lieut., R. A. T. A.) P. Slocombe, L. Young (Sept. 18). F. L. Collison (Lt., 4th Essex Regt.) is granted a short-service commission as a Flying Officer, with effect from and with seniority of Sept. 6.

The follg. Pilot Officers are promoted to rank of Flying Officer :—J. C. C. Slater (March 12) ; W. F. Rimmer, E. B. C. Groner (May 15) ; E. J. Ellis, J, A. E. Inkster, G. M. E. Shaw (Aug. 6) ; V. J. Sofiano (Sept. 6) ; J. C. Noel, L. F. T. Price (Sept. 17). The follg. Pilot Officers, on probation, are confirmed in rank (Sept. 13) :—W. I. N. Strong, J. Constable-Roberts, J. W. Duggan, I. J. Fitch, H. P. Hudson, R. J. Legg, A. A. Leslie, N. McLeod, R. R. Nash, R. G. Pace, N. C. Pleasance, N. C. Ross-Roberts, G. H. Shaw, S. R. Sherman, L. R. Stokes, G. A. V. Tyson, E. F. Wain, E. C. Foreman.

Flying Officer S. H. Hardy is restored to full pay from half-pay (Sept. 20) ; Flight-Lieut. F. Beaumont is placed on half-pay, scale B, from Sept. 1 to 30, inclusive ; Flying Officer R. D. V. Howard is transferred to Reserve, Class A (Oct. 5) ; Flight-Lieut. D. S. Jillings, M.C., is placed on retired list at his own request (Oct. 1). The follg. Lieuts., R.N., Flying Officers, R.A.F., relinquish their temp. commns. on return to Naval duty :—H. E. Guerrier (Sept. 28) E. A. A. Gibbon (Oct. 1).

Stores Branch

Flying Officer B. E. Essex is granted a permanent commission in this rank with effect from Nov. 24, 1925, on completion of probationary service. The follg. are transferred to Stores Branch on probation as Flying Officers with effect from and with seniority of Oct. 1 :—Flight-Lieut. L. V. Hirst. Flying Officers J. R. R. Harvey, M.M. ; L. W. Park ; J. W. Hustwaite, M.B.E. ; M. F. Tomkins ; J. W. Mitchell.

Flying Officer J. C. Daniels is transferred to Reserve, Class C (Oct. 1).

Accountant Branch

Pilot Officer on probation R. J. Wishlade is confirmed in rank and is promoted to rank of Flying Officer (Aug. 10). The follg. Flying Officers are transferred to Reserve, Class C. :—J. P. A. Fulton (Oct. 1) ; H. Hedderwick (Oct. 1) ; H. C. Roberts (Oct. 6).

Medical Branch

Flying Officer G. J. Hanly, M.B., is granted a permanent commission in this rank (Oct. 6) ; Flying Officer R. F. G. Dickson relinquishes his short-service commission on account of ill-health (Sept. 22).

Reserve of Air Force Officers

C. E. F. Sayer is granted a commission in Classs A.A., General Duties Branch, as a Pilot Officer on probation (Sept. 20). The follg. Pilot Officers are confirmed in rank (Sept. 30) :—A. W. Lindsay, H. Wood.

Flying Officer A. E. Francis is transferred from Class A to Class C (Oct. 5). The follg. Flight Lieutenants are transferred from Class D2 to Class D1 :—J. C. Smyth (Aug. 26) ; O. St. L. Campion (Oct. 3). Pilot Officer C. T. G. R. Miller resigns his commission (Oct. 5). The commission of Pilot Officer on probation P. D. V. Hackett is terminated on cessation of duty (Aug. 31).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Wing Commanders : W. H. Primrose, D.F.C., to Air Ministry, for Tech. Staff duties, 21.9.26. V. S. Brown, to Station H.Q., Upavon, to command, 6.9.26.

Squadron Leader R. G. Parry, D.S.O., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 1.10.26.

Flight Lieuts. : H. E. Walker, M.C., D.F.C., to H.Q., Spec. Reserve and Auxiliary Air Force ; 21.9.26. W. A. C. Morgan, M.C., A. H. Orlebar, A.F.C., R. M. Trevethan, M.C., W. E. G. Mann, D.F.C., and G. L. Ormerod, to H.Q., Iraq ; 21.9.26. T. Henderson, M.C., A.F.C., and K. B. Lloyd, A.F.C., to No. 70 Squadron, Iraq ; 21.9.26. T. C. Thomson and P. J. Clayson, M.C., D.F.C., to Aircraft Depot, Iraq ; 21.9.26. C. Boumphrey, D.F.C., to No. 481 Flight, Malta ; 21.9.26. A. H. Flower, to No. 208 Sqdn., Egypt ; 21.9.26. P. Murgatroyd, to No. 4 Flying Training Sch., Egypt ; 21.9.26.

Flight Lieutenants : F. M. F. West, V.C., M.C., and W. G. Meggitt, M.C., to Station H.Q., Upavon, 6.9.26. T. M. Williams, M.C., D.F.C., to No. 402 Flight, Mediterranean, 1.10.26. N. Comper, to Marine Aircraft Experimental Estab., Felixstowe, 30.10.26.

Flight Lieutenants : G. F. Smylie, D.S.C., and H. I. T. Beardsworth, to R.A.F. Depot, Uxbridge, 12.10.26. A. F. James, to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 13.10.26. C. J. Brockbank, M.B.E., to Air Ministry, Directorate of Equipment, 30.9.26. M. Moore, O.B.E., to R.A.F. Depot, Uxbridge, 25.9.26. O. W. de Putron, to R.A.F. Depot, Uxbridge, instead of to No. 99 Sqdn., as previously notified, 12.8.26.

Flying Officers : W. A. Chase, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt ; 28.8.26. M. H. Fitzgerald, to R.A.F. Depot, Uxbridge ; 27.9.26. T. Marchant, C. Snow and A. P. Marchant, M.B.E., D.S.M., to Aircraft Depot, Iraq ; 21.9.26. H. S. Sandiford and M. W. C. Ridgway, to No. 6 Armoured Car Co., Iraq ; 21.9.26. E. D. Barnes and V. Harris, to No. 5 Armoured Car Co., Iraq ; 21.9.26. M. H. Ely, to Station Commandant, Basra ; 21.9.26. J. N. Boothman and (Hon. Flight-Lieut.) U. C. de Burgh, to No. 55 Sqdn., Iraq ; 21.9.26. G. N. P. Stringer, to No. 30 Sqdn., Iraq ; 21.9.26. F. E. Nuttall, to No. 84 Sqdn., Iraq ; 21.9.26. R. R. Bennett, to Aircraft Depot, Iraq ; 21.9.26. J. H. Parry and C. W. Switzer, to No. 70 Sqdn., Iraq ; 21.9.26. H. T. J. Jagger, to No. 6 Sqdn., Iraq ; 21.9.26. (Hon. Flight-Lieut.) A. E. G. Forrest, to Aircraft Depot, India ; 21.9.26. R. L. Bateman, J. H. Hutehinson and R. A. Seaton, to No. 4 Flying Training Schl., Egypt ; 21.9.26. H. M. Whitte, to No. 481 Flight, Malta ; 21.9.26. W. J. P. Sloan, to No. 27 Sqdn., India ; 21.9.26. V. B. Bingham-Hall, M.C. and C. H. Noble, to No. 208 Sqdn., Egypt ; 21.9.26. A. J. Holmes, to No. 28 Sqdn., India ; 21.9.26. C. A. C. Fidler, D.C.M., to Electrical and Wireless Schl., Flowerdown ; 11.10.26. G. P. H. Carter, to No. 11 Sqdn., Netheravon ; 17.9.26. C. G. C. Sullivan, to R.A.F. Training Base, Leuchars ; 27.9.26. N. W. F. Mason, to No. 24 Sqdn., Kenley, on transfer to Home Estabt. ; 21.9.26. F. L. Collinson, to No. 24 Sqdn., Kenley, on appointment to a Short Service Commn. ; 6.9.26.

Flying Officers : L. W. Beek to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 9.7.26. E. D. Cummings, D.F.C., to No. 440 Flight, Mediterranean, 1.10.26. A. H. J. Howlett, to No. 460 Flight, Mediterranean, 1.10.26. E. S. Osborn, to No. 9 Sqdn., Manston, 29.10.26. A. M. Webster, to No. 1 Flying Training Sch., Netheravon, 12.10.26. H. P. Morris, to No. 24 Sqdn., Kenley, 18.10.26. F. E. Vernon, to R.A.F. Depot, Uxbridge, 12.10.26. J. A. Mollison, to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 28.9.26. J. H. C. Wake, to R.A.F. Depot, Uxbridge, 5.10.26. G. W. R. Russell, to No. 28 Sqdn., India, 10.9.26.

Pilot Officers : S. H. Hardy and F. B. Tomkins, to No. 84 Sqdn., Iraq ; 21.9.26. R. Matheson and C. Heard-White, to No. 55 Sqdn., Iraq ; 21.9.26. J. H. Leach, to No. 5 Flying Training Schl., Sealand ; 4.10.26. R. L. Burnett to No. 20 Sqdn., India ; 21.9.26.

Pilot Officers : E. J. Ellis, to No. 28 Sqdn., India, 1.7.26. C. R. McEvoy, to Electrical and Wireless Sch., Flowerdown, 27.9.26. G. P. Butcher, to No. 27 Sqdn., India, 10.9.26.

Accountant Branch

Sqdn. Leader R. Whyte, to Aircraft Depot, Iraq ; 21.9.26.

Flight Lieut. J. C. Brice, to Aircraft Depot, Iraq ; 21.9.26.

Flight Lieutenants : H. J. Gilbert, to Aeroplane and Armament Experimental Estab., Martlesham Heath, instead of to No. 1 Sch. of Tech. Training (Apprentices), as previously notified, 23.9.26. H. C. F. Ellis, to No. 1 Sch. of Tech. Training (Apprentices), Halton, 4.10.26. H. J. Gilbert, to remain at Sch. of Tech. Training (Men), Manston, instead of to Aeroplane and Armament Experimental Estab., as previously notified. H. C. F. Ellis, to remain at Aeroplane and Armament Experimental Estab., instead of to No. 1 Sch. of Tech. Training (Apprentices), as previously notified.

Flying Officers : F. C. Chalmers, to Brigade Accountant Office, Iraq ; 21.9.26. R. T. Carter, to No. 5 Armoured Car Co., Iraq ; 21.9.26. H. J. Titherington, to No. 6 Armoured Car Co., Iraq ; 21.9.26. E. Smith, to No. 55 Sqdn., Iraq ; 21.9.26.

Flying Officers : R. G. Dyer, to Central Accountant Office, Poona, 21.9.26. S. C. George, to No. 2 Armoured Car Company, Palestine, 6.9.26.

Pilot Officer R. A. J. Mullarkey, to R.A.F. Base, Gosport ; 20.9.26.

Pilot Officers : J. P. Cave and W. F. Quilliam, to Station H.Q., Upavon, 6.9.26.

Medical Branch

Group Captain C. E. C. Stanford, D.S.O., M.B., B.Sc., to H.Q., Iraq. pending disposal, 21.9.26.

Flight Lieutenant R. S. Topham, M.B., D.Ph., D.M.R.E., to R.A.F. Hospital, Halton, 1.11.26.

Flight Lieutenant (Dental).—T. K. Place, to H.Q., Egypt, 21.9.26.

Flying Officers : G. J. Griffiths, T. W. Wilson, D. B. Smith, M.B., J. McM. Wilder, F. B. C. L. B. Crawford, M.B., R. J. K. Chattey, B. L. Edwards, M.B., and E. A. Aslett, to H.Q., Iraq, 21.9.26. J. Magner, M.B., and E. J. Mockler, M.B., to H.Q., India, 21.9.26. P. D. Barling, M.B., to H.Q., Egypt, 21.9.26. P. H. Perkins, to No. 58 Sqdn., Worthy Down, instead of to No. 100 Sqdn., as previously notified, 15.9.26. G. S. Strachan, M.B., to Station H.Q., Bircham Newton, instead of to Station H.Q., Andover, as previously notified, 28.8.26. C. W. Coffey, to Station H.Q., Andover, instead of to Station H.Q., Bircham Newton, as previously notified, 18.9.26.

Flying Officer C. W. Coffey to Station H.Q., Bireham Newton ; 18.9.26.

Flying Officers (Q. Mstr.), Medical) : F. W. Goodread, to Stores Depot, Iraq, 21.9.26. D. Breen, to Palestine General Hospital, 21.9.26.

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AIR MAILS: AUTUMN SUSPENSIONS

THE Postmaster-General announces that as from October 2 the undermentioned Air Mail services and relative despatches will be suspended for the winter. The route numbers quoted are those shown on p. 2 of the current Air Mail Leaflet (July 1926 edition).

Letter Mails.—London–Lyons–Geneva–Marseilles, and the Friday morning supplementary despatches by air to Marseilles of letters for India and beyond, Egypt, Iraq, Aden, and East Africa. (Route 2.)

Paris–Prague–Vienna and beyond (Route 4.)

From Cologne to Munich. (Route 5B.)

From Hamburg to Malmo, and from Stockholm to Helsingfors. (Route 7B.)

London–Hanover–Berlin–Königsberg. (Route 8.)

London–Kovno, for letters to Lithuania, Lettonia, and Estonia. (Route 9A.)

Moscow–Kharkhov. (Route 9B.)

Routes 5A (London–Brussels–Cologne) and 7A (London–Amsterdam–Hamburg) are being maintained ; and the latter route, by connecting at Hamburg with ordinary night services thence, will continue to offer advantage for letters to Denmark, Sweden, and Eastern Norway. The Königsberg–Moscow section of Route 9A (London–Kovno–Moscow) will be maintained until October 30 (last despatch from London October 28), and will continue to offer a saving of one or two days for letters to all parts of Russia, and a later connection at Moscow with the through trains thence to Siberia and the Far East. The relative despatch will be closed at the General Post Office, London, at 6 p.m. each weekday.

Parcel Air Mails.—The direct air parcel service to Berlin (*see* p. 3 of the Leaflet) will cease after the 2nd inst. The services to Cologne and Hamburg will be maintained.

NOTICES TO AIRMEN

Parachute Descents from Civil Aircraft

It is notified that under Article 13 of the Air Navigation (Consolidation) Order, 1923, as amended by the Air Navigation (Amendment) Order, 1925, parachute descents from civil aircraft are prohibited unless permitted by directions issued by the Secretary of State.

Formal application for the necessary permission, giving full details of the proposed descent, should be addressed to the Secretary (A & L), Air Ministry, Gwydyr House, Whitehall, London, S.W.1, at least 14 days prior to the date on which it is desired to make the parachute descent.

(No. 56 *of* 1926).

R.A.F. Procedure for Starting Aeroplanes

It is notified :—

1. In order to avoid risk of accident when personnel of the Royal Air Force or of Government civil aerodromes are employed for starting up aeroplanes it is necessary that pilots should follow a uniform procedure for swinging air screws ; the procedure in use in the Royal Air Force has accordingly been extended to Government civil personnel.

2. This procedure, which should be strictly observed by civil pilots when R.A.F. or Government civil personnel are engaged, is outlined with each notice sent out. The pilot should exercise the greatest care never to allow the airscrew to be touched before he has ascertained that the switches are in the "switch-off" position, and should realise that if an accident in starting up occurs through his failure to observe the correct procedure he alone will be held responsible.

Air Pilot.—A copy of this Notice should be inserted in the Air Pilot at the end of Chapter II, the pages being numbered 14 A-C, and the paragraphs 51 A-B.

(No. 58 of 1926).

* * *

SOCIETY OF MODEL AERONAUTICAL ENGINEERS

The Society put up a most excellent exhibit at the recent Model Engineer Exhibition held at the Horticultural Hall (Westminster) from September 17 to 25. The stand showed a representative display of the progress which has been made in the past few years with flying models, and the machines exhibited by members did great credit to the S.M.A.E. Several of the models were holders of British records. More especially was this progress noticeable in that the fuselage type of model (*i.e.*, one that has its motive power, whether rubber or compressed air, totally enclosed) has almost entirely superseded the spar type of machine.

The models exhibited and their awards are as follows :—

	Exhibitor.	Award.
Fuselage tractor.. ..	S. R. Badley ..	—
Racing monoplane ..	R. N. Bullock ..	Silver medal.
Compressed air model ..	C. C. Dickinson	Commended.
11-ft. span C.A. model	F. de P. Green ..	Highly commended.
Fuselage tractor "Kestrel" ..		Silver medal.
Autogiro ..		Very highly commended.
Speed monoplane		Highly commended.
C.A. fuselage tractor		Bronze medal.
Fuselage tractor monoplane (Firefly type) ..	H. T. Jackson ..	—
Tailless monoplane ..	B. K. Johnson ..	Very highly commended.
Low-wing fuselage monoplane	S. G. Mullins ..	—
"Wing-only" type model	D. A. Pavely ..	—
Duration fuselage tractor	W. J. Plater ..	Silver medal.
Deep fuselage tractor monoplane	L. G. Tucker ..	—

Besides the flying models, the stand was well equipped with material which showed the general activities of the society, such as photographs, lantern slides, posters, etc. Among the many persons in the aeronautical world who visited our stand during the week were Dr. A. P. Thurston (President) and Air Vice-Marshal Sir Sefton Brancker, Director of Civil Aviation. Altogether our exhibit proved one of the greatest successes we have had for many years.

B. K. Johnson,
Hon. Secretary.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 989 (*Ae.* 200).—An Investigation of the Flow of Air Around an Aerofoil of Infinite Span. By L. W. Bryant and D. H. Williams. February, 1924. Price 1*s.* 9*d.* net. *No.* 995 (*M.* 32).—The Behaviour of Single Crystals of Aluminium Under Static and Repeated Stresses : Parts 1, 2 and 3. By H. J. Gough, D. Hanson and S. J. Wright. November, 1924. Price 3*s.* 6*d.* net. *No.* 1015 (*Ae.* 218).—On the Drag of an Aerofoil for Two-Dimensional Flow. By A. Fage and L. J. Jones. November, 1925. Price 7*d.* net. H.M. Stationery Office, Kingsway, London, W.1.

Technologic Papers of the Bureau of Standards : No. 320.—A Fabric Tension Meter for Use on Aircraft. By L. B. Tuckerman, G. H. Keulegan and H. N. Eaton. Department of Commerce, Bureau of Standards, Washington, D.C., U.S.A.

Theorie des Segelfluges. By Dr.-Ing. W. Klemperer. *Abhandlungen aus dem Aerodynamischen Institut, No.* 5. Julius Springer, Linkstr., 23–24, Berlin, W.9. Price 6·90 Reischmark.

Technical Notes of the U.S. National Advisory Committee for Aeronautics : No. 242. Improving the Performance of a Compression Ignition Engine by Directing Flow of the Inlet Air. By C. Kemper. July, 1926. *No.* 243.—The Characteristics of the N.A.C.A. M-12 Airfoil Section. By G. J. Higgins. August, 1926. *No.* 244.—Navy Propeller Section Characteristics as Used in Propeller Design. By Fred E. Weick. August, 1926. *No.* 245.—Report on Tests of Metal Model Propellers in Combination with a Model Ve-7 Airplane. By E. P. Lesley. August, 1926. The National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

U.S. National Advisory Committee Reports : No. 223.—Pressure Distribution on the C-7 Airship. By J. W. Crowley, Junr., and S. J. De France. *No.* 235.—Interaction between Air Propellers and Airplane Structures. By W. F. Durand. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

The Air Pilot Monthly Supplement. No. 24.—October, 1926. Air Ministry, Kingsway, London, W.C.2.

* * *

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations : Cyl. = cylinder ; i.c. = internal combustion ; m. = motor
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

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13,165. V. C. Richmond and G. H. Scott. Rigid airships. (258,316.)
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15,718. E. H. van Valkenberg. Dirigibles. (258,341.)
26,261. R. Leparmentier. Aircraft. (241,592.)
30,004. Dr. M. Klein. Vehicles with cylindrical propellers rotating in a flowing medium. (243,755.)

APPLIED FOR IN 1926

Published October 14, 1926

15,439. E. H. van Valkenberg. Dirigibles. (258,524.)
15,440. E. H. van Valkenberg. Dirigibles. (258,525.)
15,441. E. H. van Valkenberg. Ballasting-devices for airships. (258,526.)
15,442. E. H. van Valkenberg. Engine mountings for airships. (258,527.)
21,078. Airship Guarantee Co., Ltd., B. N. Wallis and C. D. Burney. Lighter-than-air aircraft. (258,539.)

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THE Receiver of the "Registratie No. 2 en Domeinen," at Middelburg (Holland), draws the attention of persons interested to the fact that shortly he will proceed to let:—The Naval Air Navigation Establishment at Veere, comprising hangars, workshops, offices and aerodrome, as well as the movables, belonging to the above-mentioned establishment.—For further particulars, apply to the above mentioned Receiver.

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N. V. Nederlandsche Vliegtuigenfabriek. Rokin 84, Amsterdam.
Parnall, George, & Co., Park Row, Bristol. 4775 (2 lines); "Warplanes," Bristol.
Roe, A. V., Ltd., Manchester. City 8530, 8531, Manchester: "Triplane," Manchester.
Hamble, near Southampton:
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Saunders, S. E., Ltd., Cowes, Isle of Wight.
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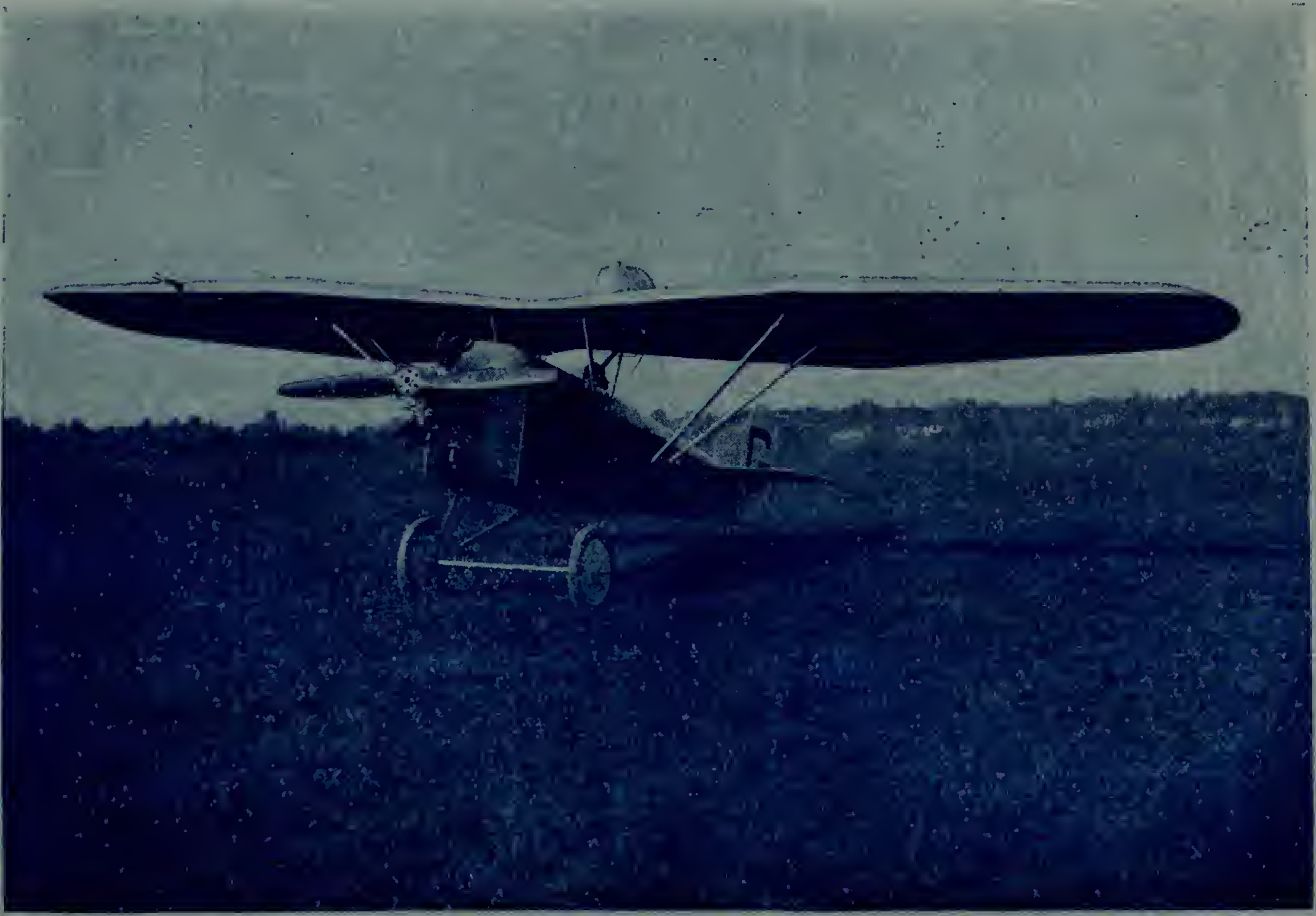

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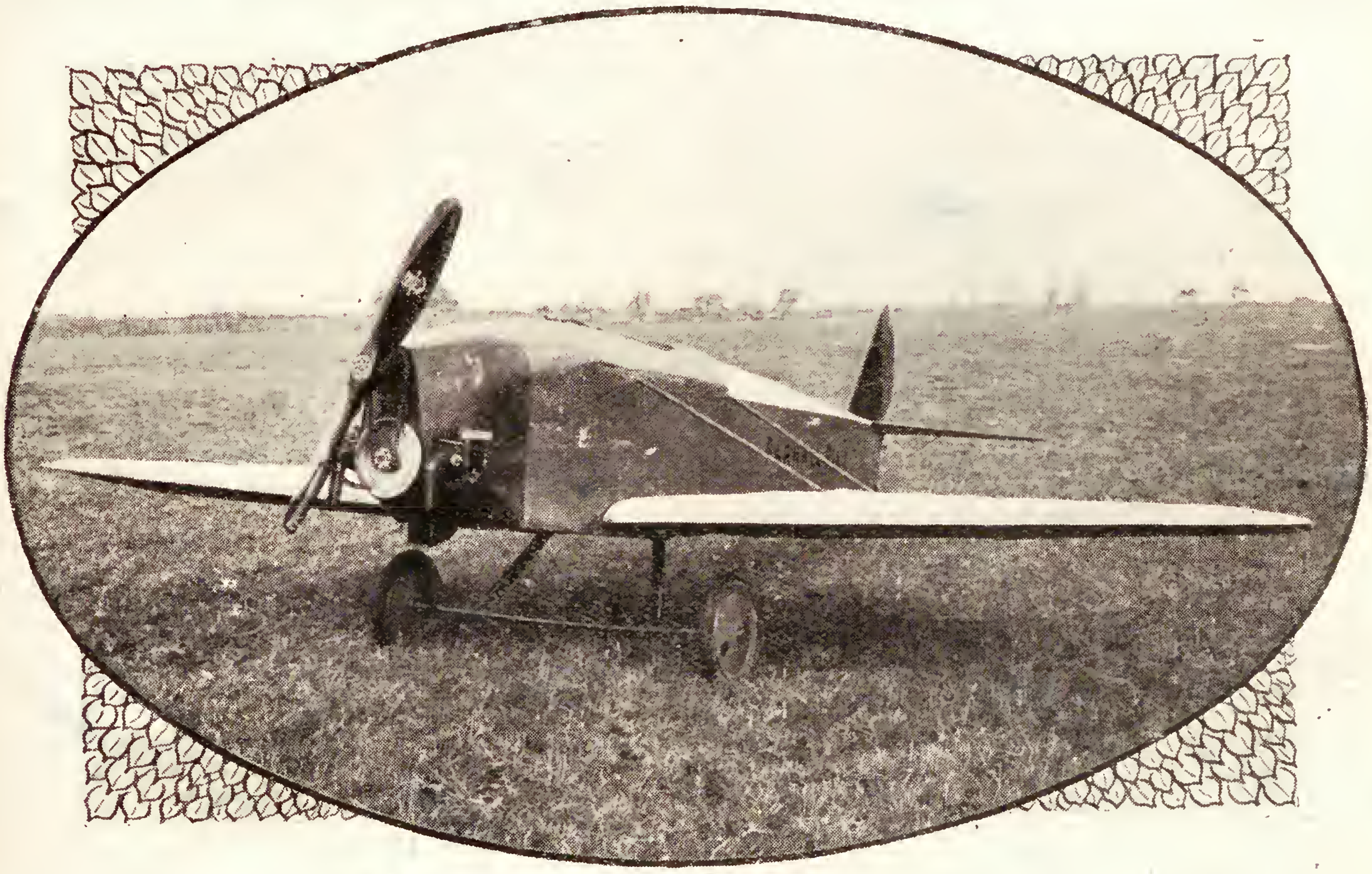

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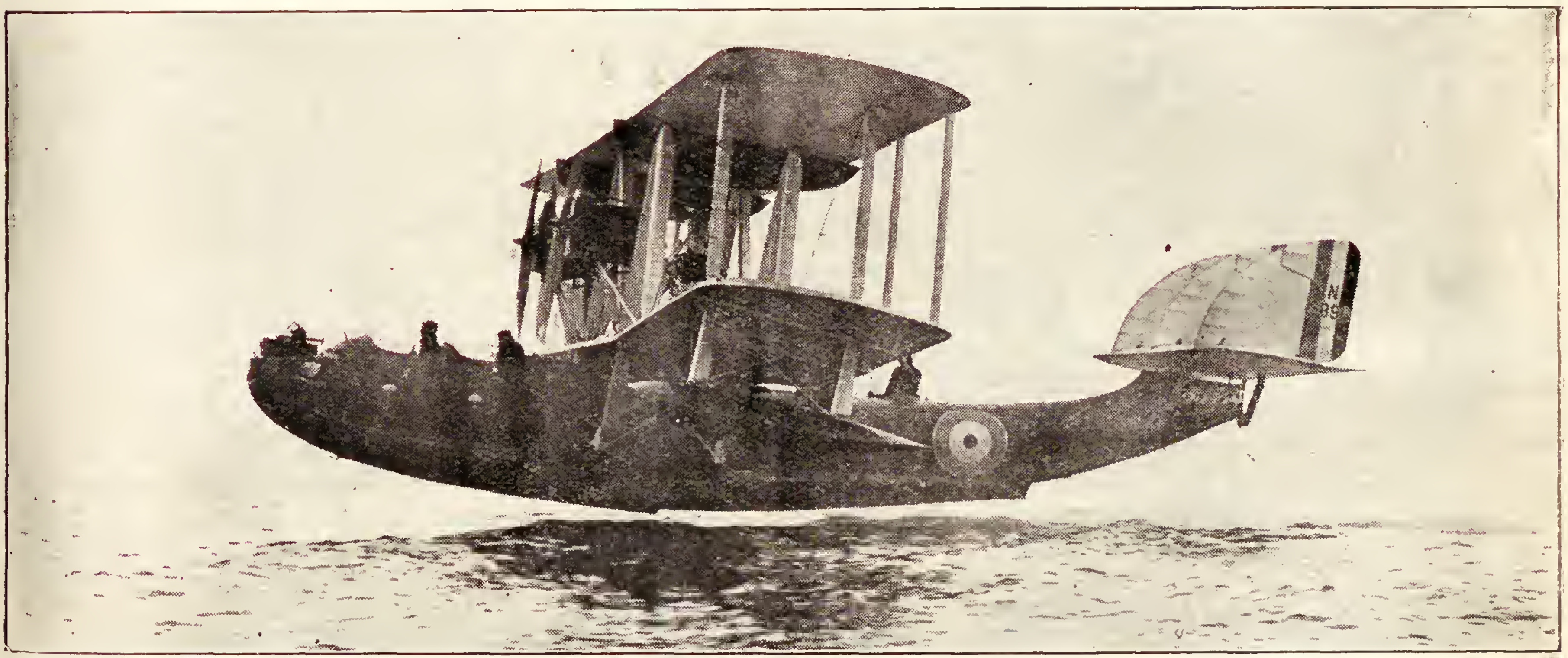

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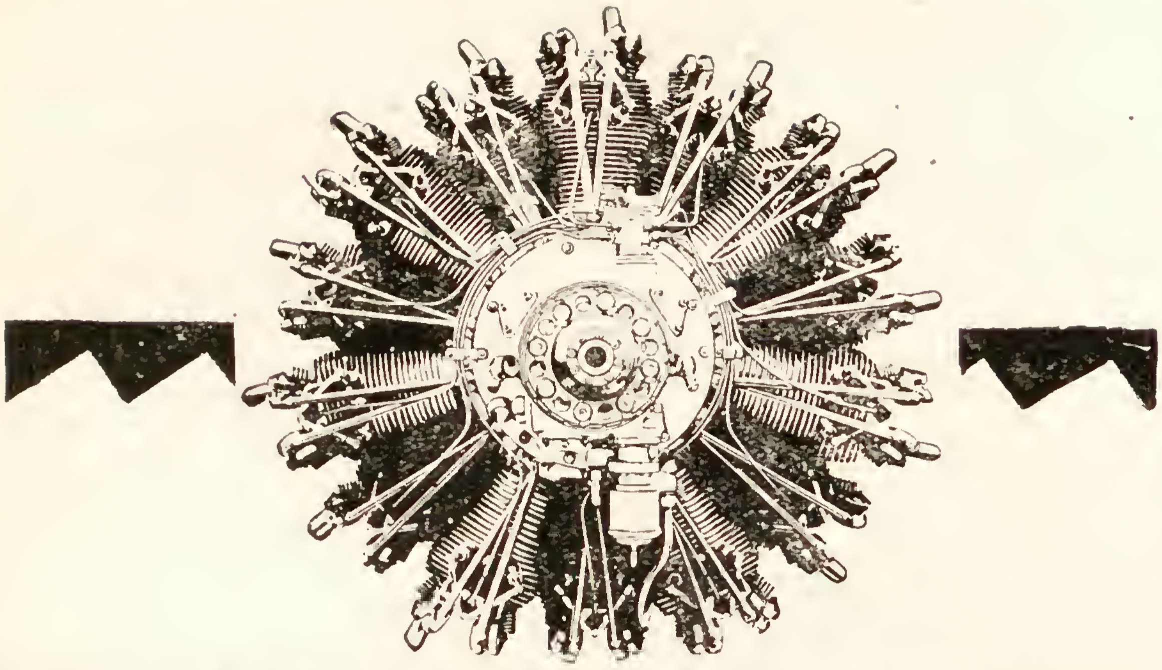

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Oct. 23	Visit of Dominion Premiers to Croydon Aerodrome.
Oct. 24–28 ...	Coppa del Mare, Italy.
Oct. 26	Mr. G. H. Dowty. "Aircraft Alighting and Arresting Mechanisms," before I.Ae.E.
Nov. 4	Mr. G. F. Mucklow. "Hydrogen as an Auxiliary Fuel for a Solid Injection Engine." Joint Meeting R.Ae.S. and Inst.A.E.
Nov. 18	Mr. R. S. Capon. "Methods of Performance Testing and Analysis," before R.Ae.S.
Nov. 21	Lecture, "Meteorology in the Service of Man" by Dr. G. C. Simpson, C.B., at the Guildhouse, Eccleston Square, S.W. 1.
Dec. 2	Mr. P. B. Bradshaw. "Alloy Steels for Aero Work," before R.Ae.S.
Dec. 3–19	Paris Aero Show
Dec. 16	Wing-Comdr. C. D. Breeze, A.F.C., R.A.F. "The Training of Aircraft Apprentices," before R.Ae.S.

EDITORIAL COMMENT.

Empire Aviation

THE importance to the Empire of treating aviation from the Imperial point of view is by now so well recognised that there is no necessity for us to dwell upon the point in connection with the Imperial Conference at present sitting in London. Our very excellent Air Minister, Sir Samuel Hoare, may be relied upon to do all that is possible in the way of putting the case for Empire Aviation clearly and concisely. That the British Empire, scattered as it is over the face of the earth, is in greater need of rapid communications than probably any other nation in the world will not be denied, and the whole question therefore reduces itself to finding ways and means. Doubtless, aviation will be very fully discussed during the Conference, not only from the Empire defence point of view, but also from that of civil aviation. Concerning the former, it would appear probable that one of the main subjects for discussion will be the question as to whether and to what extent, the Dominions should contribute towards the common air defences of the Empire, and what form such contributions should take. It is obvious that questions such as these cannot profitably be discussed in a technical journal, nor, as the politicians have it, is it "in the best interests of the nation" that the information which must necessarily be given at such a conference should be made public. As regards types of machines for air defence purposes, the Dominion Premiers will have an opportunity at Croydon, on Saturday, of seeing some of the machines in use at home, although it is to be feared that some of our latest and most interesting types may not be present. The reason for this is not quite obvious. Many of them took part in the "fly-past" in the last R.A.F. Pageant, at which may be assumed to have been present hundreds of representatives of nations not members of the British Empire. Why these machines should be withheld from the demonstration on Saturday is, therefore, not quite obvious.

Apart from this absence of really new types, there is the question of our latest seaplanes. These, obviously, could not be shown at Croydon, but it is to be hoped that arrangements will be made for the Dominion representatives to visit some air station at which all our latest types can be demonstrated. Felixstowe suggests itself, and machines from other stations could be collected there. In view of the tremendous importance of the seaplane to the British Empire the fullest possible opportunity should be afforded the Dominion representatives of familiarising themselves with the very high state of development which the seaplane has reached in this country.

We gather that it is intended that the Dominion representatives should visit Cardington in order to see the new mooring-mast erected there and to inspect the work on the new large airship. All well and good and eminently proper. But the seaplane is likely to be of at least as great importance as the airship, and should not be overlooked.

Concerning civil aviation, the visit to Croydon should help to show how a modern airport is organised and operated, while the machines that will be present will include all the latest types of commercial aeroplanes. Again, however, the seaplane type will be absent, except for the fact that the Short "Mussel" and the D.H.50J will be present in the form of aeroplanes. It is somewhat unfortunate that we have not, in the Mother Country, any organised seaplane route which it is worth while to put forward as an example, the weekly service to the Channel Islands being a farce.

On the subject of Empire air routes, doubtless the Imperial Conference will be fully informed of the progress that has been made in the planning and organisation of the Cairo-Karachi line which is to commence operations early next year, as well as of the latest developments in connection with the airship programme, which latter may be of greater interest to the Canadian representatives, since an airship route across the Atlantic seems more likely to be feasible in the near future than does a seaplane service.

The all-important subject, however, so far as the Imperial Conference is concerned, will undoubtedly be that of Dominion participation in financing Empire Aviation. We believe that all the representatives fully realise the importance of this, and, consequently, we look forward hopefully to the Conference bearing fruit.

SATURDAY'S DEMONSTRATION AT CROYDON

A very interesting programme has been arranged for the demonstration which is being held at the London Terminal Aerodrome, at Croydon, on Saturday next, October 23, when the Dominion Premiers and other representatives, at present attending the Imperial Conference in London, will be present. The demonstration, which has been given the official title of "Inspection of Service and Commercial Aviation," will commence at 2.30 p.m. In this connection we should point out that the normal public enclosure at the Croydon Aerodrome will be closed on that day, but that another public enclosure is being arranged along Plough Lane, in which there will be free admission to a limited number of spectators.

The first item on the programme consists of an inspection of a large number of machines which will be lined up on the aerodrome. Particulars of the machines which will be on view in this aircraft "park," will be found at the end of these notes. At the completion of the inspection of the aircraft park on the aerodrome, there will be an exhibition of aerobatics by two pilots of No. 56 (Fighter) Squadron on Armstrong-Whitworth "Siskins." This will be followed by a demonstration of air manœuvres by radio telephony by nine pilots of No. 41 (Fighter) Squadron, who will be mounted on Gloster "Grebes."

The last event in which Service aircraft take part will be a flight over the aerodrome of two squadrons (9 and 7) of Vickers "Virginias," which will fly over in bombing formation.

Possibly, by way of contrast between these big bombers and small two-seater light 'planes, the next event will be a display of the De Havilland "Moth" by Mrs. Eliott-Lynn, who will take out the machine from its shed, unfold its wings and fly around the aerodrome, alighting again and bringing the machine into its shed.

During the afternoon, visitors will be given the opportunity of making flights in the Armstrong-Whitworth "Argosy" and in the Handley Page W.10, which will go up at 3.40 and again at 4 p.m.

While these passenger flights are taking place, such visitors as are still on the ground will pay a visit of inspection to a series of exhibits which have been arranged in a hangar. Among the things to be seen here will be a duplication of the operation of the control tower on the aerodrome, which will give an excellent idea of the manner in which the air traffic to and from the Croydon Aerodrome is handled in actual practice. The working of the meterological services will also be explained and illustrated, and the Aircraft Operating Company has arranged to give an illustration of the manner in which air survey is carried out by that company. Not the least interesting exhibit on the aerodrome will be the new flood light which, with a strength of four million candle-power, is claimed to produce over the aerodrome the equivalent of 75 per cent. of daylight.

From 4.15 to 4.25 all the Royal Air Force and civilian machines assembled on the aerodrome will take off to return to their home stations, and at 5 p.m. the visitors will depart for London. Tea and light refreshments will be served from 4 p.m. onwards.

Machines to be Shown

Among the machines which will be lined up for inspection on the aerodrome, the following commercial types will be on view: The Armstrong-Whitworth "Argosy" (three Armstrong-Siddeley "Jaguars"); the De Havilland "Hercules" (three Bristol "Jupiters"); the Handley Page W.10 (two Napier "Lions"); the Handley Page W.9 "Hampstead" (three Armstrong-Siddeley "Jaguars"); the Handley Page W.8 F "Hamilton" (one Rolls-Royce "Eagle" and two Siddeley "Pumas"); the Handley Page W.8 B (two Rolls-Royce "Eagles"); the Handley Page "Hamlet" (three Bristol "Lucifers"); the De Havilland 54 "Highclere" (one Rolls-Royce "Condor"); and Sir Alan Cobham's D.H.50 GEBFO (Armstrong-Siddeley "Jaguar") on which he flew to South Africa and back and Australia and back.

The light 'plane class will be represented by two De Havilland "Moths," one with "Cirrus" engine and one with "Genet" engine; the Hawker "Cygnet" (Bristol "Cherub") on which Lieut. Bulman won the *Daily Mail* competition recently, the Bristol "Brownie" ("Cherub"), the Westland "Widgeon" ("Genet"), the Short "Mussel" ("Cirrus"), the Avro "Avian" ("Genet"), and the Blackburn "Bluebird" ("Genet").

The following Service types will be on view: *Single-seater fighters:* Gloster "Grebe" ("Jaguar"), Gloster "Gamecock" ("Jupiter"), Armstrong-Whitworth "Siskin" ("Jaguar"), Hawker "Woodcock" ("Jupiter"), and Sopwith "Snipe" (B.R.2).

Single-engined day bombers: D.H.9A ("Liberty"), Fairey "Fawn" (Napier "Lion"), Fairey "Fox" (Fairey "Felix"), Hawker "Horsley" (Rolls-Royce "Condor").

Two-engined night bombers: Vickers "Virginia" (Napier "Lions"), Vickers "Vimy" (Rolls-Royce "Eagles"), Handley Page "Hyderabad" (two "Lions").

Of *Army co-operation* machines only one will be on view, *i.e.*, the good old Bristol Fighter with Rolls-Royce "Falcon" engine.

But a single *troop-carrier* will be shown: the Vickers "Victoria" with two Napier "Lions."

The *Fleet Air Arm* will be represented by the following types: Fairey "Flycatcher" (Armstrong-Siddeley "Jaguar") The Blackburn "Blackburn" and the Avro "Bison," both gunnery spotters with Napier "Lion" engines, the Fairey III D reconnaissance, also Napier "Lion" and the Blackburn "Dart" torpedo-carrier ("Lion" engine).

Two standard *training types* will be on view, *i.e.*, the Avro 504 K with Gnome Monosoupape engine and the Avro 504 N with Armstrong-Siddeley "Lynx" engine.

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THE VICKERS "VIRGINIA" LONG DISTANCE BOMBER

(Twin 450 h.p. Napier "Lion" Engines)

Extract from :—

OFFICIAL REPORT.

Parliamentary Debates

HOUSE OF COMMONS.

Vol. 192. No. 18. Thursday, 25th February, 1926.

"**The SECRETARY of STATE for AIR (Sir Samuel Hoare) :** ... ... Last year the Air Force carried out a series of remarkable long-distance flights in the neighbourhood of the British Isles. Here are one or two of them. On 24th September, five Vickers' Virginias, from No. 9 Bombing Squadron, flew from Manston, in Kent, to Leuchars, the most Northerly air station in the British Isles, and back to Manston in a day, a distance of 870 miles. A second flight was undertaken by eight Vickers' Virginias from Worthy Down, in Hampshire, again to Leuchars, on 3rd September. Although the weather was very bad, three of the machines flew from Hampshire to Edinburgh and back without landing.

Lieut. Commander BURNEY : With full service load ?

Sir S. HOARE : Yes, with full service load, and as an ordinary service exercise, and not in any way as a stunt. They flew a distance, of about 800 miles, spending as much as 12½ hours continuously in the air ... ..."

LENGTH OVERALL ...	50'-7"
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SPAN (SPREAD) ..	86'-6"
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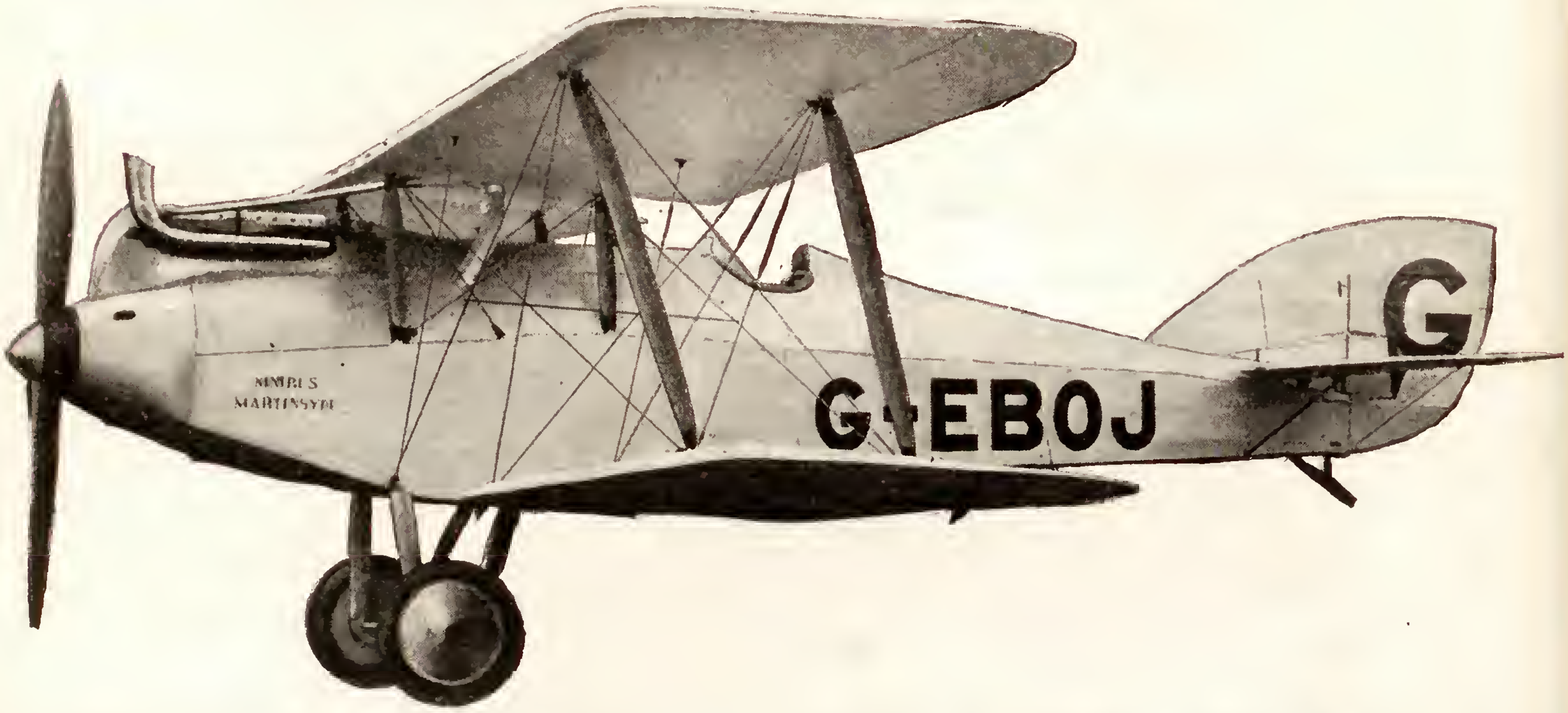

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The standard equipment includes two Vickers Guns and a Magazin for 1,200 rounds of ammunition.

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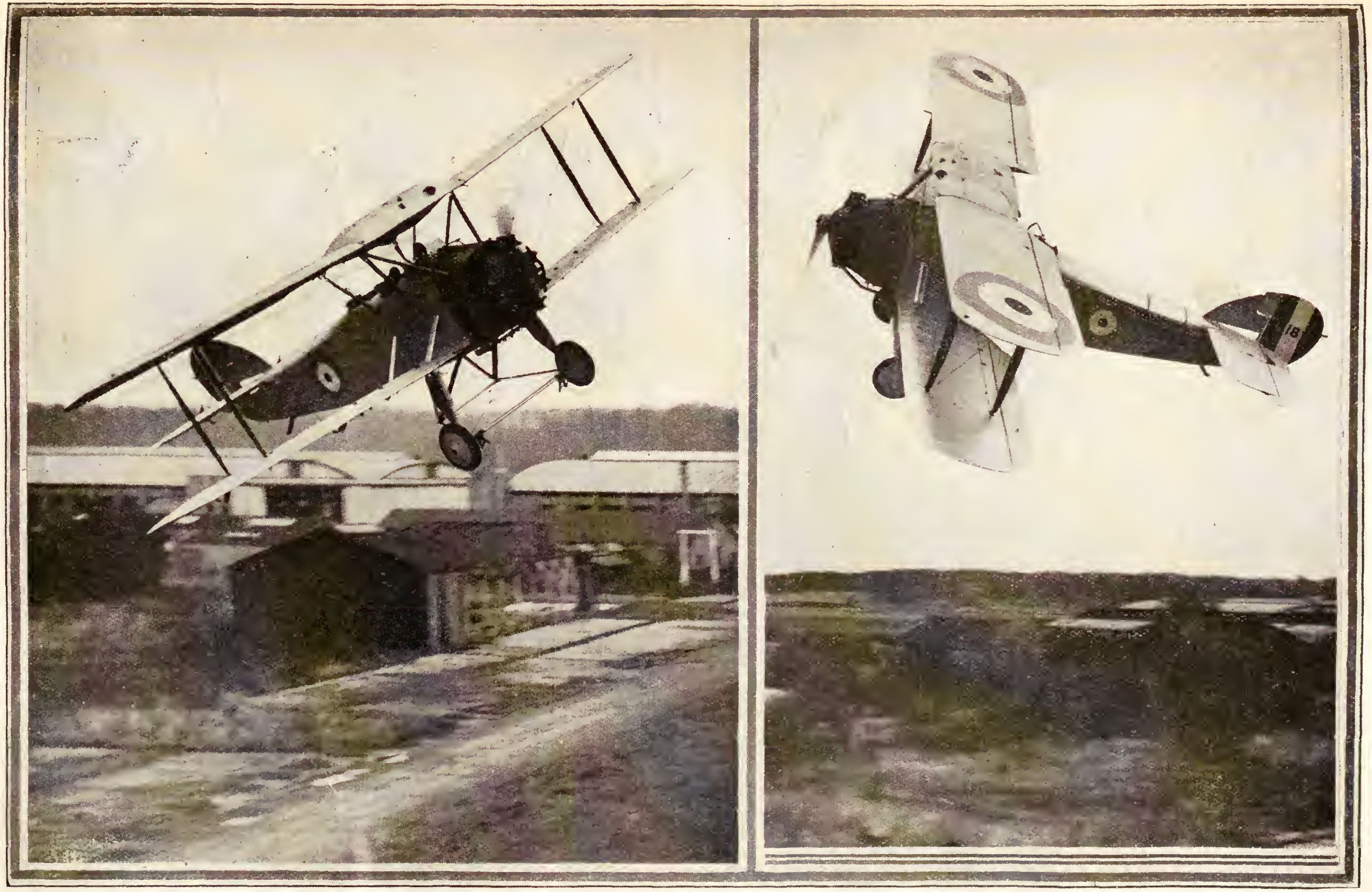


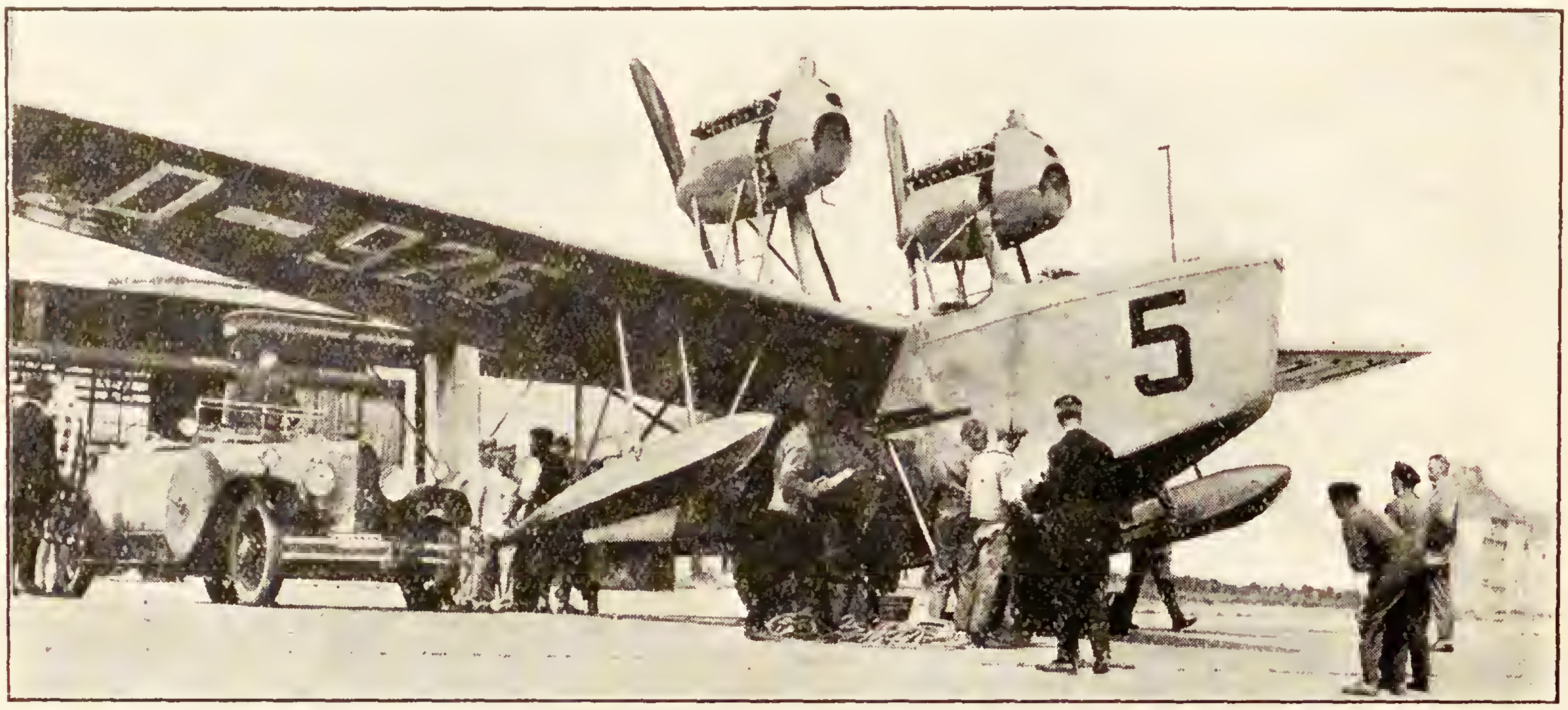
["FLIGHT" *Photographs*

GETTING THE NAVY INTO THE AIR: Two Views of the Hawker "Hedgehog" with Bristol "Jupiter Series VI" Engine during a test flight, piloted by Lieut. Bulman, at Brooklands. This machine has been designed as a three-seater reconnaissance and gunnery spotter for use by the Fleet Air Arm.

WING LOADING AND WORLD'S RECORDS

Rohrbach Flying Boat Beats Five World's Records

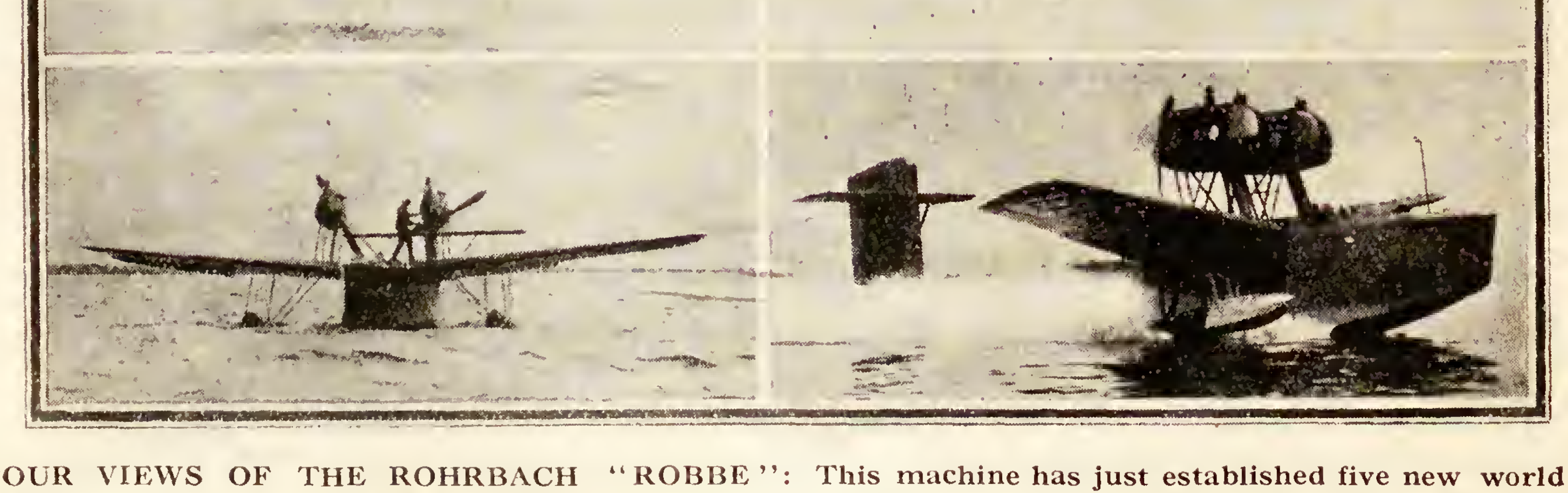
IN view of the controversy that has arisen out of the accident to the Sikorsky machine on which it had been intended to fly from New York to Paris, concerning the possibility or otherwise of getting a machine to take off with a wing loading of 21 lbs. per sq. ft., it is interesting to find that recently a German flying boat with a very heavy wing loading indeed not only succeeded in getting off the water, but actually beat five world's records. The machine in question was the Rohrbach Ro. VII, "Robbe," fitted with two B.M.W. engines of 230 h.p. each.



THE ROHRBACH "ROBBE": Three-quarter front view of the machine on the slipway supported on its beaching trolleys. Note the very deep and narrow hull with perfectly flat sides.

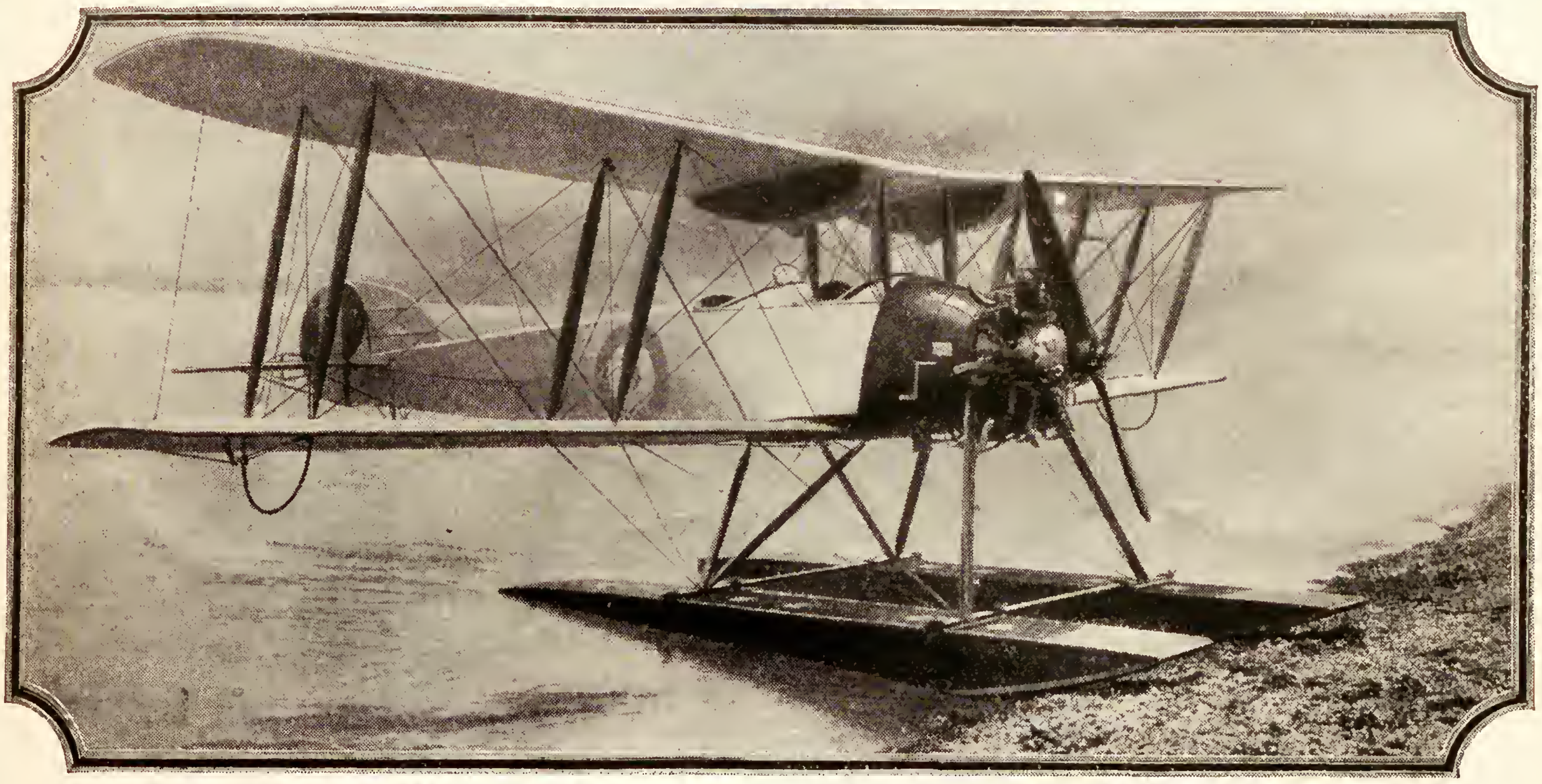
It may be recollected that the Rohrbach Metall-Flugzeugbau of Berlin had entered two of these machines for the seaplane competition which concluded some little time ago at Warnemünde, but that, through various engine troubles, etc., the machines were prevented from taking part in certain sections of the competition, particularly in the long-distance coastal flights. By the time the competition had reached the stage of the seaworthiness tests, for which it was prescribed that machines should take off and alight in a seaway of magnitude 4 and should also describe figures of 8 on the water, the engines had been put in order and the Rohrbach machines passed the seaworthiness tests extremely well. Having failed to make the coastal flights, however, they could naturally not be considered for the distribution of prizes.

The results obtained at Warnemünde, apart from the disappointment at not being able to take part in the coastal flights, were so encouraging that the Rohrbach Company decided to put one of these machines through an attempt to beat a few of the existing world's records, and consequently the Copenhagen branch of the company proceeded to put the machine in shape for officially observed record attempts. The result was that the Ro. VII established five new world's records, which have now been homologated by the F.A.I. It may be mentioned that one of these was previously held by the United States of America, the other four by the Dornier Company of Friedrichshafen. Thus the very old



FOUR VIEWS OF THE ROHRBACH "ROBBE": This machine has just established five new world's records. Its wing loading is 17.15 lbs. per square foot. In the view of the machine taxying, the tail is seen to be well clear of the spray. The hull has a pronounced vee bottom.

AVRO



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rivalry between Dornier and Rohrbach is still going on, and at the moment, so far as these particular records are concerned, at any rate, Dr. Rohrbach is on top.

The five new records established by the Ro. VII were as follows :—

(1) Speed over a distance of 100 kilometres (62 miles), with useful load of 500 kg. (1,100 lb.), 186 kilometres per hour (115 m.p.h.). (2) Speed over 500 kilom. (311 miles), with a useful load of 500 kg., 180 kilometres per hour (112 m.p.h.). (3) Speed over 100 kilometres with useful load of 1,000 kg. (2,200 lbs.), 186 kilometres per hour (115 m.p.h.). (4) Speed over 500 kilometres with useful load of 1,000 kg., 180 kilometres per hour (112 m.p.h.). (5) Distance with useful load of 1,000 kg. (2,200 lbs.), 518 kilometres (322 miles).

Not completely satisfied with this performance the company experimented with propellers and succeeded in finding a pair which suited the machine better. With these propellers even better results were obtained, although naturally these do not count as world's records, not having been officially observed by representatives of the F.A.I. The performances have, however, been observed and confirmed by the Deutsche Versuchanstalt für Luftfahrt E.V. On this occasion the useful load was 1,250 kg. (2,750 lbs.). Take off in 12 to 15 secs. Horizontal speed at sea level, using normal engine controls, 201 km./h. (124·8 m.p.h.). Horizontal speed at sea level, using altitude control 217 km./h. (134·8 m.p.h.). Climb from 1,000 to 2,000 metres in 6 mins.

The Machine

In view of these rather extraordinary performances a few particulars of the Rohrbach Ro. VII may not be without interest. Generally speaking, the machine resembles the large flying boat for which the Beardmore Company hold the British rights in this country, and of which specimens are being built at Dalmuir. There are, however, very considerable differences in size as well as in power between the two types. Thus, the Ro. VII has for its power plant two B.M.W. engines of 230 h.p. each. The monoplane wing is considerably smaller than that of the older machine, and it is interesting to find that in the latest type, Dr. Rohrbach has chosen tapering wings. It may be recollected that in the older machine the wings are of uniform chord and section from root to tip. In the new machine the wing tapers both in plan and section. All-metal construction of similar form to that employed in the older type has been retained, but it is interesting to find that the hull of the latest type has a very pronounced "V" bottom, especially in front of the main step. Outboard floats are still fitted for the purpose of rendering the machine stable on the water, this being particularly necessary in this machine, the main hull of which is of relatively narrow beam although very deep, while the placing of the engines a considerable distance above the wing, naturally gives the nachine a fairly high centre of gravity. The Ro. VII can be supplied as a civil machine in which case the boat hull gives accommodation for six passengers, in addition to the pilot and engineer. The main dimensions, etc., of the Rohrbach Ro. VII are :—

Length, o.a., 13·2 m. (43 ft. 4 in.), wing span, 17·4 m. (56 ft. 2 in.) ; wing area, 40 sq. m. (431 sq. ft.) ; weight of machine, empty, 2,000 kg. (4,400 lbs.), load, 1,360 kg. (2,990 lbs.) ; total loaded weight, 3,360 kg. (7,390 lbs.) ; wing loading, 84 kg. per square metre (17·15 lbs. per sq. ft.) ; power loading, 7·3 kg. per h.p. (16 lbs. per h.p.) ; "wing power," 11·5 kg. per sq. m. (1·07 h.p. per sq. ft.) ; range, 1,200 kilom. (745 miles) ; presumably this range is only attained when all the disposable load is in the form of petrol. The machine is reported to cruise at 150 km. per hour (93 m.p.h.), and to have a landing speed of 116 km. per hour (72 m.p.h.).

It will be seen that the wing loading is exceptionally high, the more so as the power loading is by no means low.

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Sir Alan Cobham and the Kiddies

Sir Alan Cobham received a tremendous reception at the Royal Albert Hall last Saturday when he told the story of his flight to thousands of schoolgirls and schoolboys, who filled the great hall almost to overflowing. This grand treat, which was obviously thoroughly enjoyed, was arranged by the *Daily Mail*, and whilst waiting for Sir Alan, the young guests were kept amused by the band of the Royal Air Force, songs by Miss Carrie Tubb, and kinematograph films. Mr. Stanley M. Bruce, Prime Minister of Australia, was also present, and made his first public speech since his arrival in London, when he gave a short address to the children. At the conclusion of Sir Alan's lecture, which was illustrated by lantern slides, the youngsters cheered until they were hoarse, and concluded with "For He's a Jolly Good Fellow." As a souvenir of the occasion each child was presented with a cardboard model of the D.H.50 J seaplane.

The A. Keene Aerial Benefit

We wish to draw the attention of Flight readers to a Special Aerial Display and Grand Concert, which the Southern Counties Aviation Co., of Brooklands, are getting up for the benefit of the widow and children of the late Mr. A. Keene, who was killed when flying as mechanic in the aeroplane accident at Leatherhead last month. The flying display will take place at the Crystal Palace on October 27, at 2.45 p.m., when several aeroplanes will give demonstrations of stunt flying, looping, etc., after which, at 3.30 p.m., a concert will be given by West End artists. Tickets, from 1*s*. to 5*s*., may be obtained from the Crystal Palace ; G. V. Peck, Southern Counties Aviation Co., Brooklands ; or from R. H. Squire, 98-99, Jermyn Street, W.1. It is hoped that owners or pilots of aeroplanes will, if possible, come along and assist in the programme of flying—if they are willing to do so, will they please communicate with Mr. Peck, as above ? Also, even if any of our readers are unable to attend, perhaps they will nevertheless buy a ticket, and so assist a worthy cause. Donations for Mrs. Keene's Benefit Fund should be addressed to : General Manager, Crystal Palace, S.E.19.

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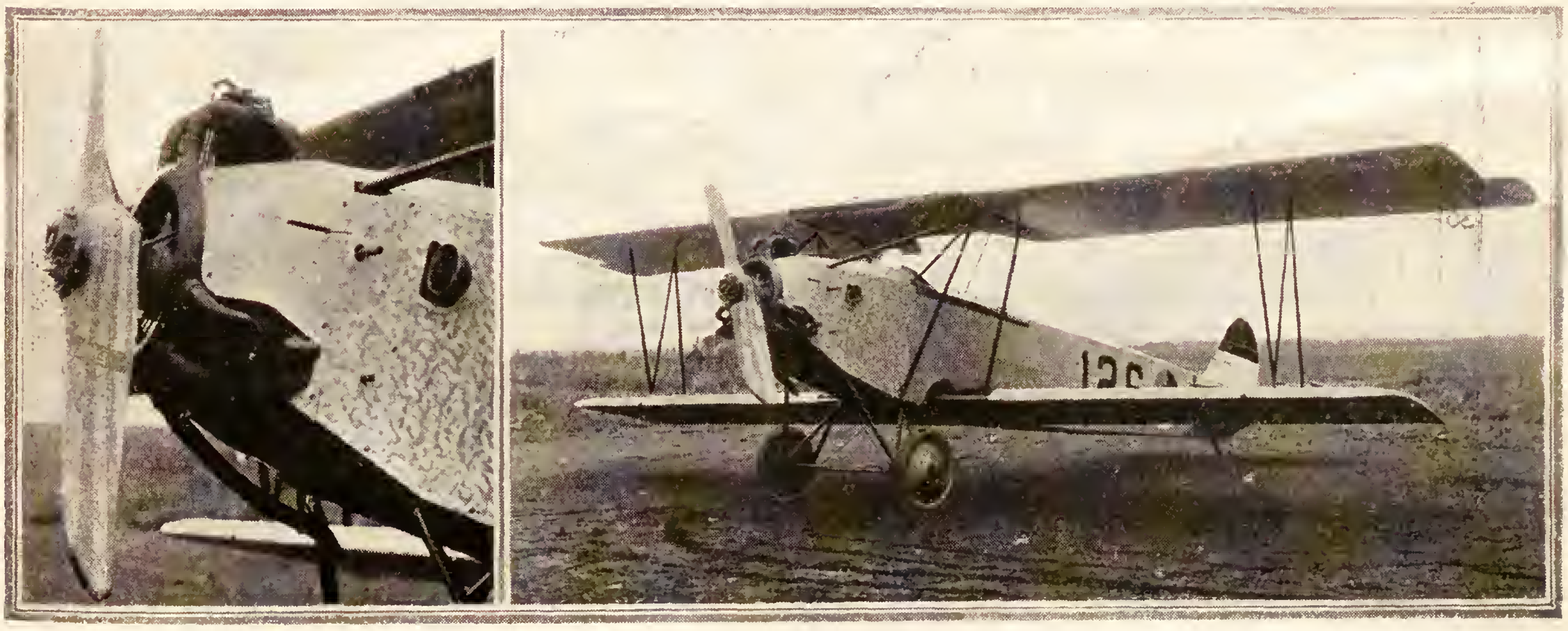

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ANOTHER AUSTRALIAN FLIGHT

Visit to South Sea Islands

By Major F. A. De V. ROBERTSON, V.D.

> *"And its twenty thousand mile to our little lazy isle*
> *"Where the trumpet orchids blow."*—*Kipling*

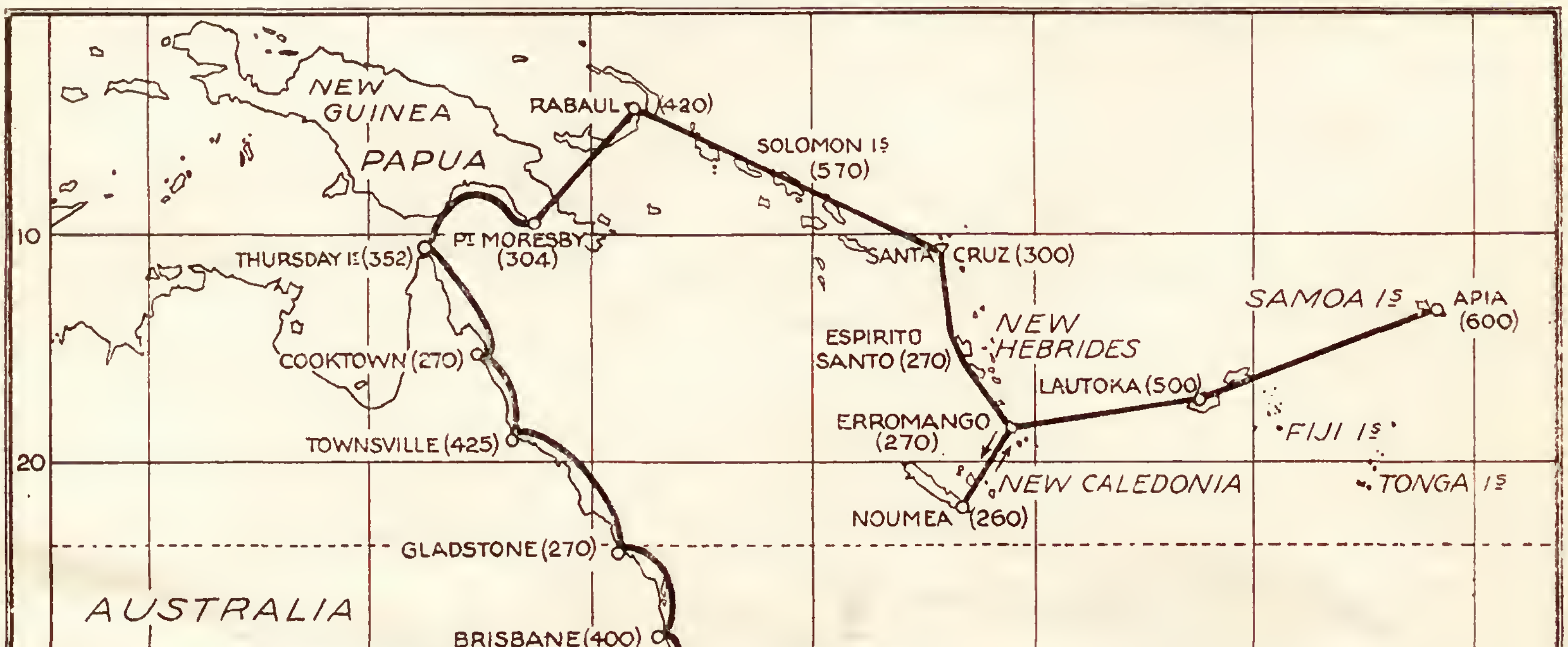
While Sir Alan Cobham has done more than any other man to popularise the aeroplane as a medium of long-distance travel, we ought not to forget the efforts made by other Britons in the same direction, though for various reasons they have not received an equal amount of publicity. The four long flights by the Royal Air Force immediately come to mind, namely, the journey of the four Fairey machines from Cairo to the Cape and back to England; the journey of the D.H.9.A bombers from Cairo to Kano in Nigeria and back; the visit of the Southampton flying boats to the Levant; and the trip of the Vickers machines from Cairo to Aden and back.

Meantime Britons in Australia have not been idle. The great flights by Australians in the past three years have been every whit as creditable and deserve just as much notice. In fact, the Royal Australian Air Force actually set the example to the Royal Air Force. On April 6, 1924, Wing Commander S. J. Goble, C.B.E., D.S.O., D.S.C., then chief of the Australian Air Staff, set out in a Fairey 3D seaplane with Rolls Royce Eagle engine, piloted by Flight Lieutenant I. E. McIntyre, C.B.E., A.F.C., to fly right round the coast of Australia. The distance was roughly 8,500 miles, and it was accomplished in 44 days. For this feat both officers received the C.B.E., and the Britannia Trophy was awarded to the pilot. Wing Commander Goble is now Australian Liaison Officer at the Air Ministry, and we much regret to hear that he has just had to undergo an operation for appendicitis in the R.A.F. hospital at Halton. We wish him a speedy recovery and a restoration to complete health—all the more so because his illness is attributed to the effects of the hardships which he underwent on his famous flight.

The second Australian effort was civilian. Colonel H. C. Brinsmead, O.B.E., M.C., Controller of Civil Aviation, in the same year undertook a flight of 7,658 miles round the interior of Australia in a D.H.50 with Puma engine. The pilot was Captain E. J. Jones, M.C., D.F.C., and Mr. R. H. Buchanan accompanied them as mechanic. They started from Melbourne on August 7, 1924, and returned on August 29 after a flight of 22 days.

The latest effort by the R.A.A.F. commenced on September 25 last, when the present Chief of the Australian Air Staff, Group-Captain R. Williams, D.S.O., O.B.E., left Melbourne in a D.H.50 (previous reports stated in error that the machine was a Supermarine "Seagull"—Ed.) with floats (Puma engine) to explore the South Sea islands. Naturally, the pilot whom he chose was Flight-Lieut. McIntyre who had proved his exceptional merit at this sort of work in the Goble flight. They are accompanied by Flight-Sergt. Trist as mechanic. The seaplane which they are using is probably the one ordered by the R.A.A.F. for the special use of the Governor-General H. E. Lord Stonehaven, which has Duralumin floats designed and made by Short Bros., of Rochester, though wheels can be substituted at short notice.

The South Sea islands always suggest romance. Australia and New Zealand are British and we have come to regard everything British as Twentieth Century and, therefore, commonplace. It is rather an effort to realise that the palm-fringed atolls of the South Seas, peopled in our imaginations by beach-combers and lovely Kanaka maidens, are part of the Australasian geographical system. A comprehensive tour of these islands would mean crossing many stretches of



SURVEYING THE PACIFIC ISLANDS FROM THE AIR: Sketch map showing the route over which Group-Capt. R. Williams, of the R.A.A.F., is making his survey of the South Sea Islands in a D.H. 50 seaplane. The flight home will probably follow the same route. The approximate distance between each port of call is given above in nautical miles

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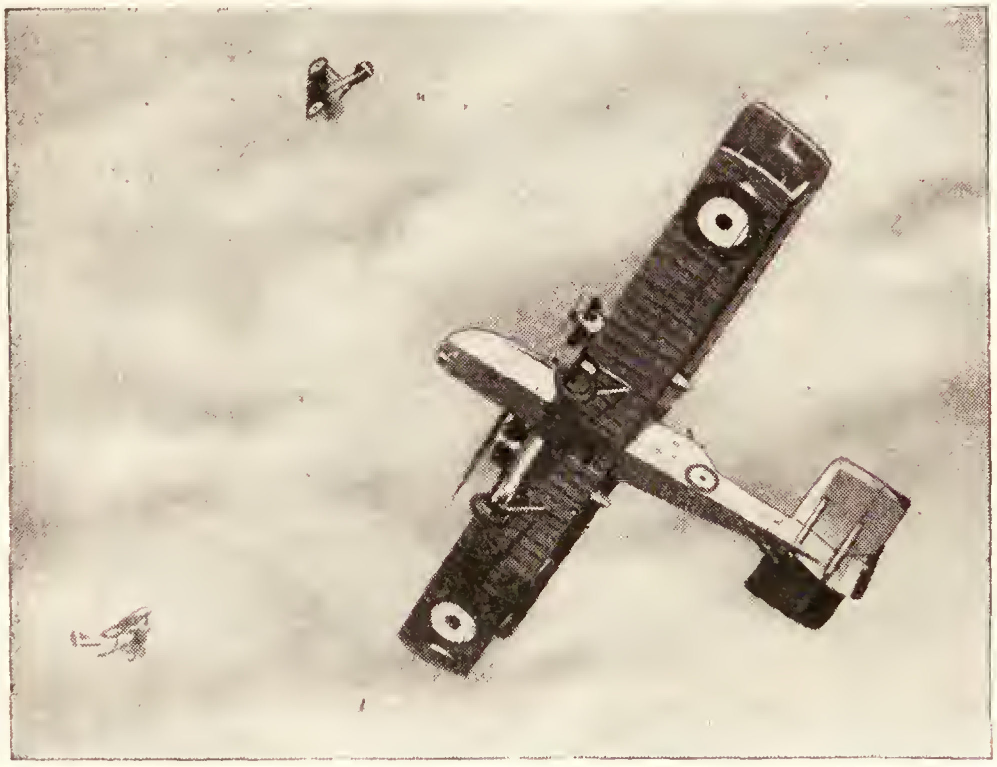

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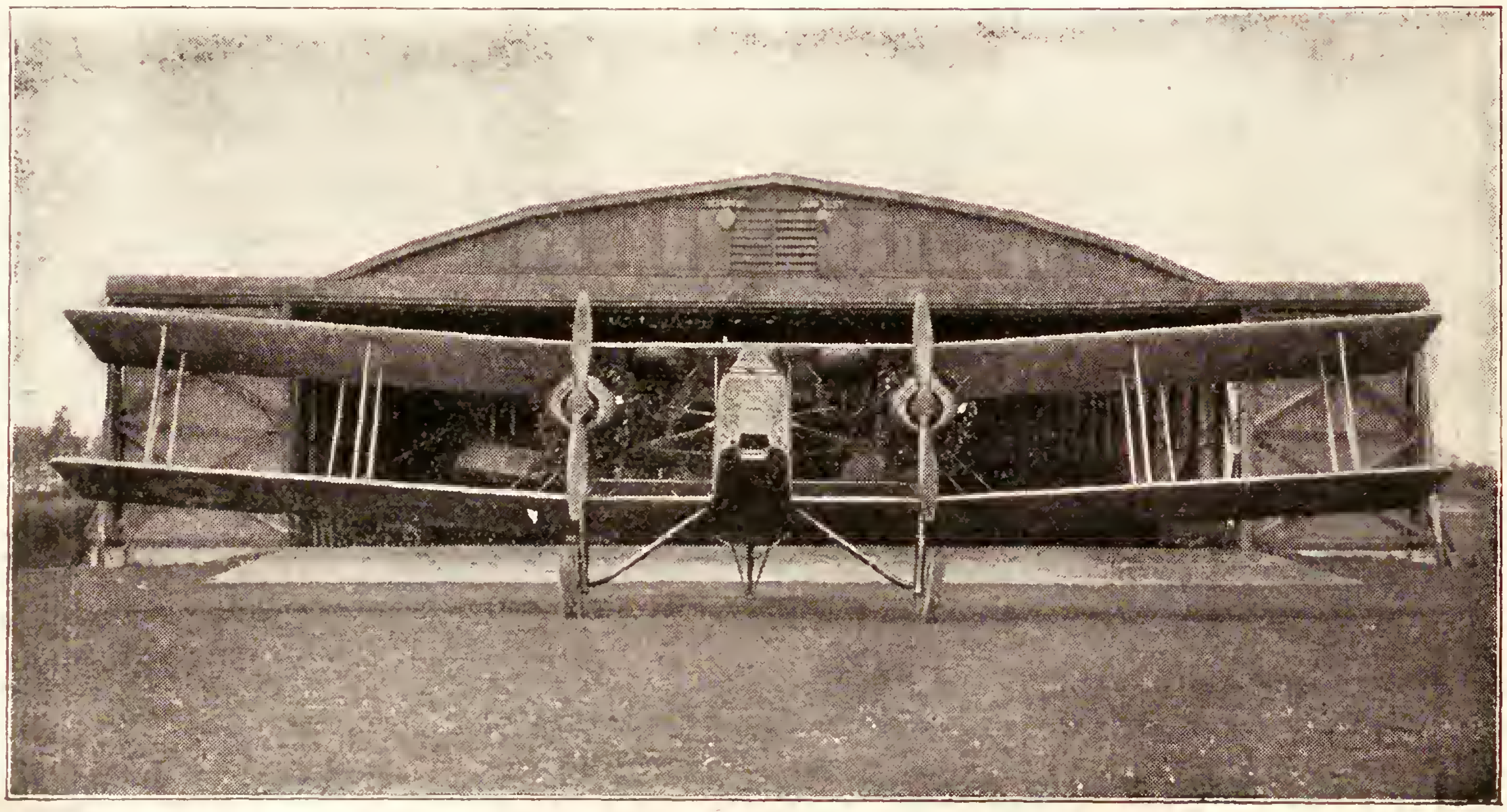

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open ocean, often for hundreds of miles at a time. The visits of steamers to any one of the islands must always be rare events. Yet, from the defence point of view, the two great British Dominions of the southern Pacific must be very much interested in these islands. And, as Australia knows that her defence system must be based on marine aircraft, it is particularly important that the R.A.A.F. should have as much knowledge of the islands as possible from the aerial point of view. There is yet another consideration. It is only by means of the air that these islands can ever hope for anything like adequate communications with the outside world. Archipelagoes are in a peculiar position in that they never can obtain all the communications which they really need so long as they depend on sea-going ships. Shipping is too expensive. Aircraft alone offers a solution of the difficulty, because it is cheaper—although, here in Europe we have come to think of air transport as unreasonably costly. In Australia they know better. Consequently, this pioneer flight of Group-Capt. Williams may have far-reaching consequences. He is showing the flag, and we know that trade often follows the flag.

Full details of the route have not yet been received in London, but the following itinerary is probably pretty correct. The miles given are nautical miles, and one-eighth should be added to translate them into land miles.

It is possible also that a visit may be paid to Nukualofa, in the Tonga or Friendly Islands before starting back from Samoa. On the return journey, most probably there would not be a second diversion from Erromango to visit the French islands of New Caledonia. Therefore, we may provisionally put the whole route down as about 11,600 sea miles. It is a great and adventurous undertaking, and we wish the best of luck to the gallant Australian airmen who are engaged upon it.

	Nautical Miles.
Melbourne	—
Sydney	560
Brisbane	400
Gladstone	270
Townsville	425
Cooktown	270
Thursday Is.	352
Port Moresby (Papua)	304
Rabaul (Bismarck Arch.)	420
Down the Solomon Isles	570
Santa Cruz	300
Esperito Santo (New Hebrides)	270
Erromango	270
Noumea, New Caledonia (French)	260
Erromango	260
Lautoka, Fiji	500
Apia, in Opolu Is., Samoa (via Keppel Island)	600
	6,031

AIRCRAFT ALIGHTING AND ARRESTING MECHANISMS

Since the early days of flying, when a length of rubber cord wrapped around skid and axle of an aeroplane undercarriage formed the accepted means of absorbing the shocks of landing, a great deal of progress has been made in the design of undercarriages. The type which has come to be almost universally used is the oleo "leg" in one form or another, and this type has the advantage of being relatively simple both to design and construct.

Nevertheless, there are still problems to be solved and improvements to be made, and the paper entitled "Aircraft Alighting and Arresting Mechanisms," which is to be read before the Institution of Aeronautical Engineers on October 26, by Mr. G. H. Dowty, A.F.R.Ae.S., M.I.Ae.E., should prove of considerable interest to practical engineers, the more so as Mr. Dowty will deal not only with the design of aircraft undercarriages, but also with the rather more difficult problems of "arrester gears."

It may be recollected that in the June 24, 1926, issue of *The Aircraft Engineer* Mr. Dowty gave an illustrated article on compression rubbers, in which he gave summarised results of tests of various rubbers. Some four years ago Mr. Dowty read a paper before the Inst. Ae. E. on oleo undercarriages, so that his subject on October 26 is one of which he has had very considerable experience.

In his paper Mr. Dowty will deal mainly with the type of oleo undercarriage, in which the "legs" have been designed to give uniform resistance throughout, and more particularly the type employing a tapered needle valve for controlling the resistance to compression. The lecturer will show illustrations of such a leg, and will give formulæ, tables and charts for the rapid determination of the proportions of the various members in order to give uniform resistance, assuming only that the weight of the aircraft and the vertical velocity permitted are given. The lecturer has managed to evolve a very simple method for making these calculations for a leg of the needle valve controlled type.

If the first part of Mr. Dowty's paper is of great interest to all whose work lies in aircraft drawing offices, the second part of the paper should have a much wider appeal, since it deals with the problems of aircraft "arrester gears," *i.e.*, a mechanism for pulling up a landing aircraft in a short distance. Mr. Dowty points out that at present no such arrester gear is used for deck landing, and that consequently only machines of relatively low landing speed can be used. He then proceeds to call attention to the advantages, not only for deck landing, but for army aeroplanes and commercial aircraft, of being able to alight in fairly confined spaces. Mr. Dowty, basing his design upon the familiar hydraulic buffers used on railway platforms, evolves a mechanism doing the same for aircraft, but in which the travel is relatively long and the resistance small.

It is not proposed to rob Mr. Dowty's lecture of its interest by giving too much detail in advance, but we may say that the paper refers to an arrester gear claimed to be capable of bringing to rest in a distance of 300 ft., a machine landing at 90 m.p.h. As the distance available for landing on decks is 600 ft., aircraft with landing speeds as high as those of modern racing aircraft could be landed on a deck. This claim is sufficiently bold to make one "sit up and take notice," and Mr. Dowty's lecture deserves to be extremely well attended.

The meeting will commence at 6.30 p.m., on Tuesday, October 26, and will be held in the lecture room of the Junior Institution of Engineers, 39, Victoria Street, London, S.W. 1. We understand that non-members of the Institution will be welcomed.

Changes on Royal Aero Club Committee

In view of the increasing work of the Aircraft Operating Co., Ltd., Maj. H. Hemming, A.F.C., has been obliged to retire from the Committees of the Royal Aero Club. For several months Maj. Hemming has devoted considerable time to the Club Committee and the Racing Committee. Sir Alan J. Cobham has accepted the invitation of the Royal Aero Club to fill the vacancy on the Committee.

Royal Aeronautical Society

The Council of the Royal Aeronautical Society have decided to hold a reception on Monday, October 25, at 8.30 p.m. in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue, W.C.2, at which Sir Alan Cobham, K.B.E., will give an address, illustrated by lantern slides, on his recent flight. The Dominion Premiers and other delegates to the Imperial Conference will be present. The R.A.F. String Band will play, and a buffet will be provided. Ladies may be invited, and tickets, price 5*s.* each, may be obtained by members for themselves and their guests from the Secretary, Royal Aeronautical Society, 7, Albemarle Street, W.1.

Aero Golfing Society

The autumn meeting was held at Wentworth Park Golf Club, Virginia Water, on October 14.

Challenge Cup (presented by the proprietors of Flight) :—(1) H. E. Perrin, 90 less 14 = 76 ; (2) P. Barry, 84 less 7 = 77.

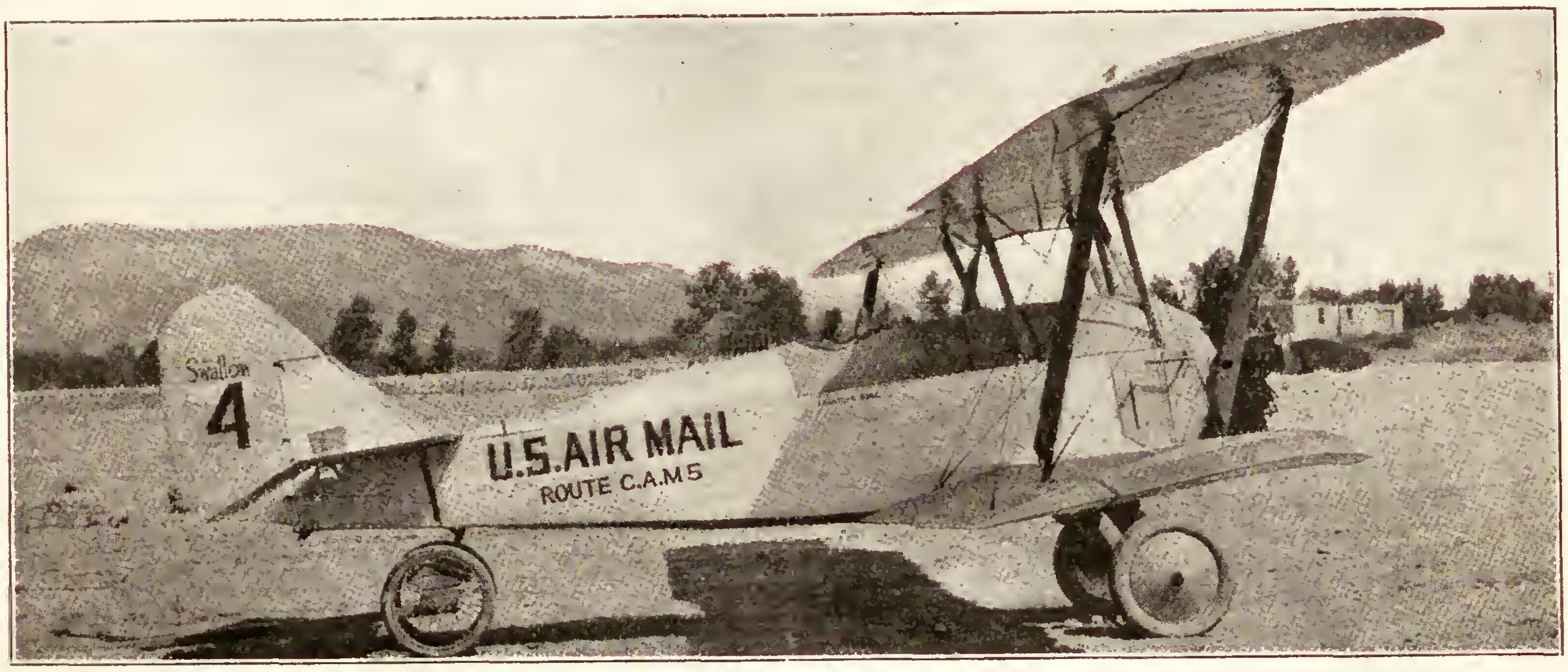
Challenge Cup (presented by Cellon, Ltd., Richmond) :—(1) E. J. B. How, 1 up.

C. Ruault and W. A. Bristow tied for second place—all square.

U.S. AIR MAIL SERVICES

Offshoots from the Transcontinental Route

Note.—In our issue for June 10 we gave a list of the ten Contract Air Mail Services which have been entered into by the U.S. Post Office Department, consequent upon the decision to extend the U.S. Air Mail Services beyond that of the original Transcontinental route, which has been in successful operation for some years. This week we give brief particulars of some of these new C.A.M. Services, and in following issues we will continue our reports on the other routes. Other articles on this subject appeared in FLIGHT for June 17 and July 1 last.



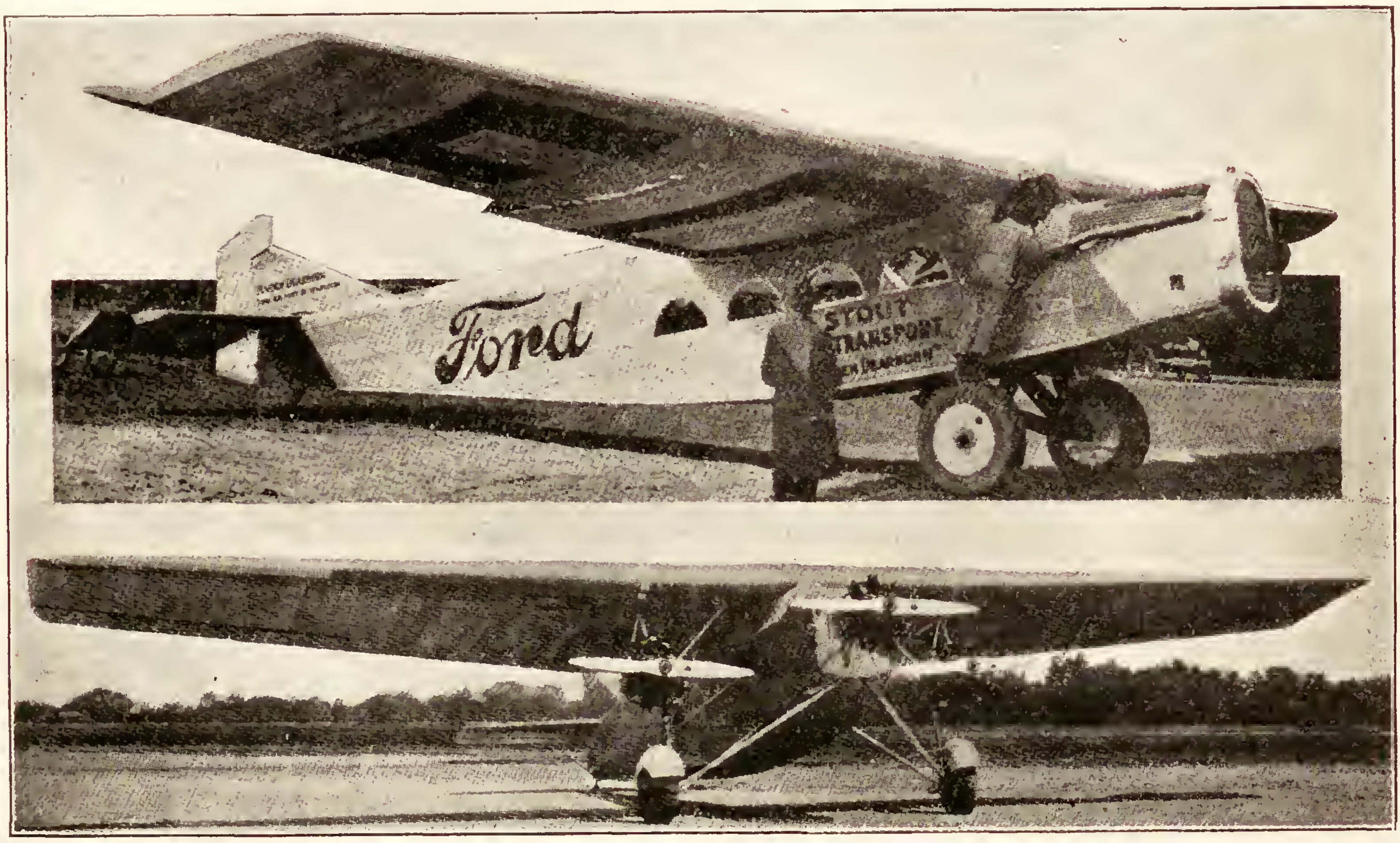
U.S. AIR MAIL SERVICES. C.A.M. No. 5.—One of the Wright "Whirlwind" engined "Swallows" now used on the Elko-Pasco route operated by Walter T. Varney.

C.A.M. No. 5.—Elko-Pasco (430 miles)

The contract for the Air Mail Service between Elko, Nev. (on the Transcontinental route), and Pasco, Wash., via Boisé, a distance of about 430 miles, was obtained by Walter T. Varney, one of America's pioneer pilots of nine years' standing, who has flown over 1,000,000 miles with only two serious crashes and not a single fatality or injury to pilot or passenger recorded against him.

This service enables Seattle, Portland, Tacoma, Spokane, and all north-western cities to be brought within practically 40 hours of New York. A letter mailed from any north-western city at 6 p.m. is taken overnight by mail train to Pasco, transferred to the mail 'plane, and arrives at Elko at 11 a.m. Thence it goes via the Transcontinental route to all points east or west; the eastbound 'plane arrives at Chicago at 8 a.m. the following morning, first delivery, and midday and afternoon to points as far distant as St. Louis and St. Paul.

This route, which entails flying over very difficult country,



U.S. AIR MAIL SERVICES. C.A.M. Nos. 6 and 7. The machine at the top is one of the single-engined (Liberty) Ford-Stout all-metal monoplanes employed at the start on the two air mail routes (Detroit-Cleveland and Detroit-Chicago) operated by the Ford Air Transport. For the future three-engined (Wright "Whirlwind") Ford-Stout all-metal monoplanes, as shown in the lower photograph, will be used.

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SIX YEARS AGO	Rolls-Royce Aero Engines in a Vickers-Vimy Aeroplane flew from ENGLAND to AUSTRALIA (11,500 miles).
SIX YEARS AGO	Rolls-Royce Aero Engines in a Vickers-Vimy Aeroplane flew from ENGLAND to SOUTH AFRICA (6,281 miles).
FOUR YEARS AGO	Rolls-Royce Aero Engines in a Fairey Aeroplane flew across the SOUTH ATLANTIC (3,800 miles).
TWO YEARS AGO	Rolls-Royce Aero Engines in a Fairey Aeroplane flew ROUND AUSTRALIA (9,800 miles).
TWO YEARS AGO	A Rolls-Royce Aero Engine in a Fokker Aeroplane flew from HOLLAND to the EAST INDIES (10,000 miles).
ONE YEAR AGO	A Rolls-Royce Aero Engine in a Handley-Page Aeroplane flew from BRUSSELS to the BELGIAN CONGO (5,084 miles).

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— DIAGRAM MAP OF GREAT BRITAIN —

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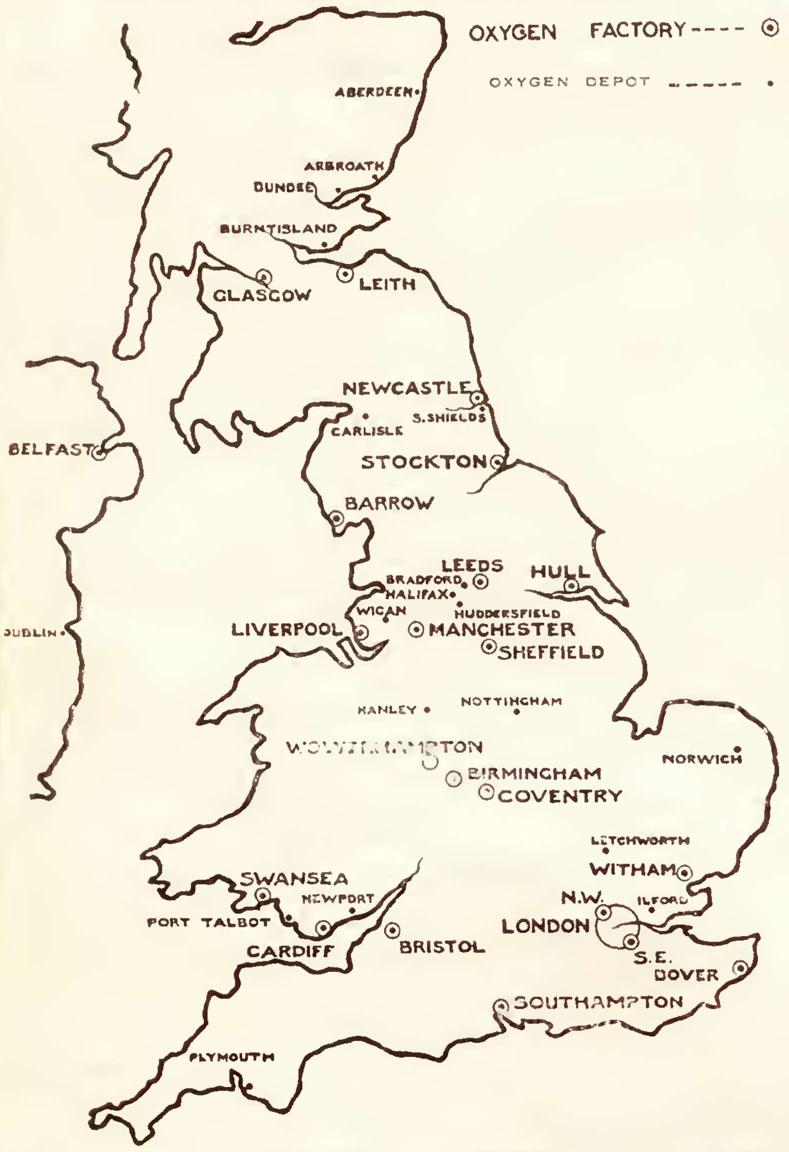

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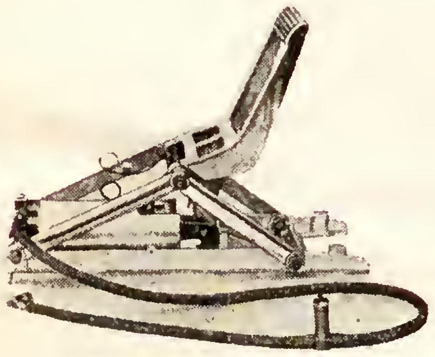

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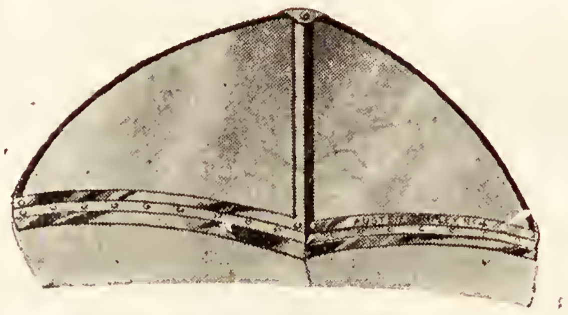

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was inaugurated on April 6 last. The first 'plane to leave Elko on this date, piloted by F. Rose, had to land in " wild " country on Juniper Mountain (65 miles south of Jordan Valley) during a storm, and some time elapsed before any news of him was received at headquarters.

The machines employed at first were six " Swallow " biplanes, specially designed for air mail service, fitted with Curtiss C.6 engines. After a few days' operation, however, it was found that these engines were hardly powerful enough for the difficult journey, and so, with the consent of the Post Office Department, the service was suspended for several weeks to enable more powerful engines being installed. Eventually 200 h.p. Wright " Whirlwind " engines were fitted to the 'planes, and the service once again got going without further trouble.

Each of the three aerodromes—Elko, Boisé, and Pasco—are equipped with wireless, in order that the pilots of the machines may be in constant touch with the ground, and weather reports, etc., are reported at intervals. The schedule provides for a daily service each way, pilots and machines being changed at Boisé in each direction.

C.A.M. Nos. 6-7—Detroit-Cleveland (100 miles); Detroit-Chicago (250 miles)

These two routes, which connect respectively Detroit with Cleveland and Chicago, were the first contract air-mail routes to be opened in America. Both C.A.M. No. 6 and C.A.M. No. 7 are operated by the aviation branch of the Ford Motor Co., of Dearborn, Mich., of which Mr. Henry Ford and Mr. Edsel Ford are the moving spirits. The Ford Air Transport concern actually started operations in the aerial transport of passengers and freight in April of last year, but the contract air mail services run by them were inaugurated on February 15 this year, when the first machine " Maiden Dearborn I " was dispatched, before a representative gathering, with mail from the Dearborn Airport, Detroit, for Cleveland. Shortly after a machine left for Chicago, a second machine having meanwhile left Chicago for Detroit. The journey from Cleveland to Detroit was made by " Maiden Dearborn I " on its return trip.

These two routes serve to link up Detroit, *via* the Transcontinental route, with New York (8 hours) to the east, and San Francisco (26 hours) to the west. The journey to Chicago takes 4 hours, and to Cleveland 3 hours. Mail for Cleveland, New York, and eastern points close daily (Sundays excepted) at 9.50 a.m., and mail for Chicago, San Francisco and western points at 2.25 p.m.

At first the machines used on these two services were the Ford-Stout all-metal monoplanes, of the high-wing cantilever type, fitted with Liberty engines. It was decided later, however, to standardise on multi-engined machines in order to reduce, as far as possible, the hazard of engine trouble. A new all-metal monoplane, provided with three engines, was therefore produced by the Ford-Stout concern for use on the two air mail routes.

These machines are also of the high-wing cantilever type, and the engines fitted are 200 h.p. Wright " Whirlwind " air-cooled radials.

The schedules for these two services are as follows: C.A.M. 6.—Detroit dep., 10.40 a.m. (E.T), Cleveland arr., 12.10 p.m. (E.T.); Cleveland dep., 3.45 p.m. (E.T.), Detroit arr., 5.15 p.m. (E.T.). C.A.M. 7.—Detroit dep., 3.15 p.m. (E.T.), Chicago arr., 5 p.m. (C.T.); Chicago dep., 8 a.m. (C.T.), Detroit arr., 11.40 a.m. (E.T.).

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THE ROYAL AIR FORCE MEMORIAL FUND

The fifth meeting of the current year of the Executive Committee of this Fund was held at Iddesleigh House, on October 13. Lord Hugh Cecil, P.C., M.P., was in the chair, and there was a large attendance of members of the committee.

It was reported that the thirty-eight boys in attendance at Vanbrugh Castle School, Blackheath, had re-assembled for the winter term on September 7.

With regard to the activities of the Grants Sub-Committee, it was reported that that committee, and the secretary, in the nine weeks which elapsed since the last meeting of the executive committee, have dealt with no less than 223 cases of appeals for assistance, and in nearly all these cases financial assistance has been granted to the applicants.

With regard to the forthcoming celebration of the Armistice, which it is understood will be held on Thursday, November 11 next, the committee decided unanimously to continue the custom of laying a wreath, provided by the Fund, at the foot of the R.A.F. War Memorial on the Victoria Embankment, and this ceremony will again be very kindly performed, on behalf of the committee, by Air Chief Marshal Sir Hugh Trenchard, Bart., G.C.B., and all relatives and friends of the Royal Air Force are invited to be present at the ceremony, which will only last a few minutes, and will probably follow the official ceremony for the three services at the Cenotaph. Further notifications regarding the matter will appear in the Press shortly.

The next meeting of the executive committee as arranged will take place at the offices of the Fund on December 15 next.

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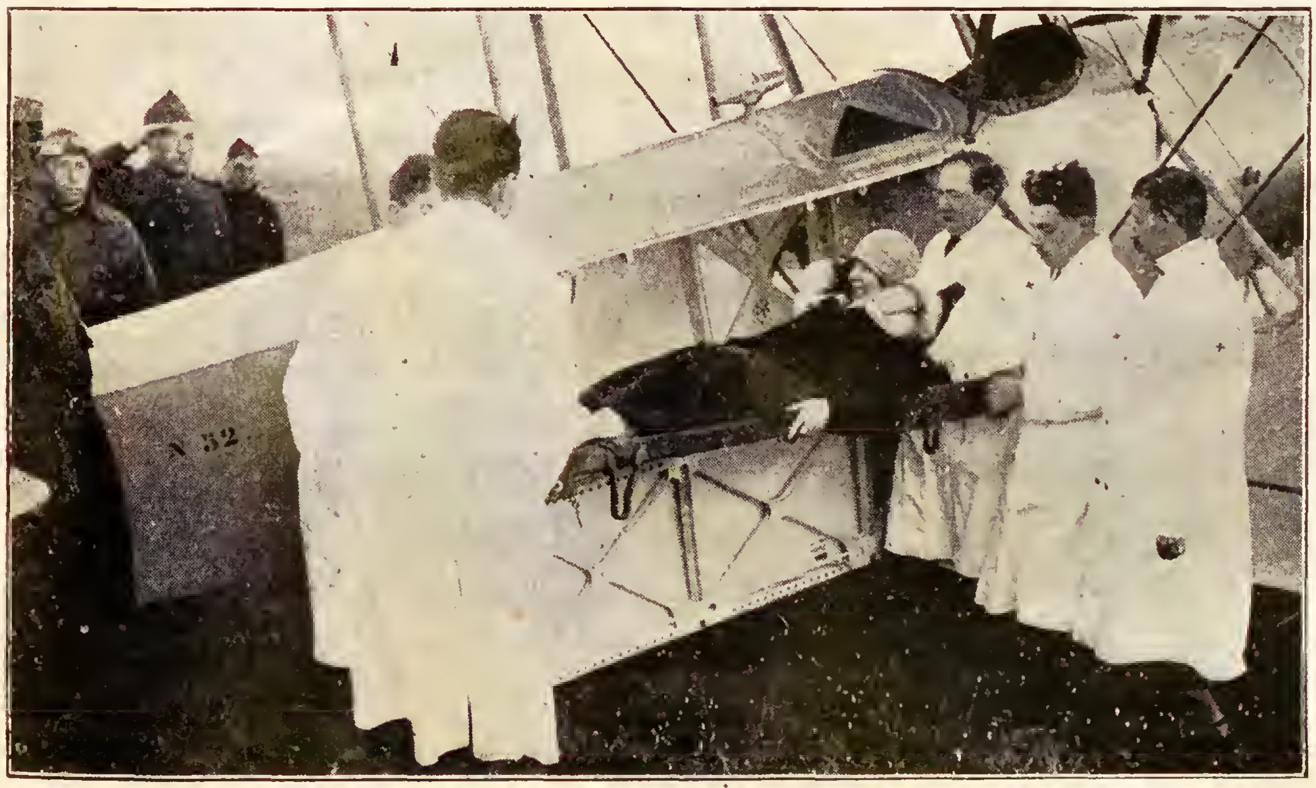
Queen of Belgium's Flight in Ambulance 'Plane

It is well known that the King and Queen of Belgium are both enthusiastic aviators—King Albert owning his own Bristol aeroplane. Queen Elizabeth has just given a remarkable demonstration of her keenness in aviation matters, when inspecting an exhibition of the work of French ambulance 'planes which was held at Evers aerodrome, near Brussels, on October 17. Her Majesty was greatly interested in one of these ambulance 'planes, and in order to test for herself the comfort of transportation in such a machine, she took her place in one of the stretchers and made a flight, lasting half an hour, over Brussels. King Albert witnessed the flight. We reproduce below a photograph showing the Queen in the machine, taken just before the start.



A Queen in an Ambulance 'Plane: Queen Elizabeth of Belgium made a flight over Brussels in an ambulance 'plane on October 17.

FROM THE FOUR WINDS

Prague International Aero Exhibition

It has been decided to hold a large international aero exhibition at Prague in the summer of next year. Previous exhibitions at Prague have been very successful and interesting, and it is anticipated that the 1927 exhibition will be more attractive than ever.

And Another in Berlin

It is also proposed to hold an international aero show in Berlin, at the Kaiserdamm Exhibition ground, either in the autumn of 1927 or spring of 1928.

The New Zeppelin "L.Z. 127"

The following particulars may be of interest concerning the proposed rigid Zeppelin airship "L.Z. 127," which, as reported in Flight some little while back, is to be constructed from funds collected through an appeal to the people of Germany. This airship, which will be employed in carrying out experiments with a view to the establishment of a Transatlantic air line, will have a capacity of 105,000 cub. m. (3,700,000 cub. ft.), and will thus be considerably larger than the "L.Z. 126" ("Los Angeles"), which had a capacity of 70,000 cub. m. (2,470,000 cub. ft.). It will be propelled by five 420 h.p. Maybach engines, and will probably be completed by the end of 1927. According to some reports it is stated that Dr. Lempertz, the chief chemist of the Zeppelin Co., has discovered a gas, having approximately the same specific gravity as air, which it is claimed can be used as fuel in place of petrol, with very successful results; this gas is said to develop 25 per cent. more calories per cub. m. than 1 kg. of petrol. Only a slight modification of the carburettor is necessary for the employment of this gas, which will be carried in special gas cells.

Additional U.S. Air Mail Routes

Several new air mail routes, in addition to the ten C.A.M. services already sanctioned by the U.S. Post Office, have been awarded to contractors, or put up to tender. Of these may be mentioned the Washington-Philadelphia route, operated by the Philadelphia Rapid Transit Air Service, the Cheyenne-Pueblo route, operated by Colorado Airways, Inc., and the Cleveland-Pittsburg route, operated by Clifford Ball. The following air mail routes have been put up to tender:—Cleveland-Louisville; Detroit-Grand Rapids; Seattle-Victoria; New Orleans-Pilottown.

"Avia" Machines for Belgium

One of the "Avia B.H. 21" single-seater fighters constructed by the Czechoslovak firm of Milos Bondy, and fitted with a 300 h.p. Hispano Suiza engine, manufactured by the Czech Skoda Works, was recently sold to the Belgian Government. It is reported that a series of these machines will be manufactured, under licence, in Belgium.

A New Italian Aero Engine

A successful 150 hours' flying test was carried out last summer at Sesto Calende with the new "Asso" aero engine built by the Isotta Fraschini firm. The engine, which develops 500 h.p., was fitted to a Savoia S.16 ter flying boat, and after two six-hour tests and climb and load tests, the machine was flown daily for a fortnight, from 7 a.m. to 1 p.m. and from 2 to 7 p.m. (10 hours). As the average speed for these tests was 180 k.p.h. (112 m.p.h.) the total distance covered was about 27,000 km. (16,780 miles).

The Brothers Arrachart Crash

Capt. and Adj. Arrachart, who recently made an unsuccessful attempt at beating the world's record for non-stop flight in a straight line, when they made a forced landing at Ekaterinenburg (or Sverdlovsk), crashed on October 12 when starting on the flight home. Capt. Arrachart injured his knee, whilst his brother broke a rib.

Tunis-Antibes Air Service

It is hoped that as soon as the air port at Tunis is completed an air service will be operated by the Compagnie Aero Navale, connecting Tunis with France. The service will be worked by seaplanes fitted with 400-h.p. engines, and it is expected that the journey from Tunis to Antibes, via Ajaccio, will be completed in six hours, with another six hours to Paris.

"Los Angeles" Out Again

The U.S. Navy rigid airship "Los Angeles" (LZ 126) made a flight on October 15 from Lakehurst, N.J., to Detroit, in 16 hrs. 23 mins.

Australian Missionary's "Moth"

The Rev. C. Daniels, whose parish at Wilconnia (New South Wales) is as large as England, has found visiting his congregation by means of motor car a somewhat lengthy proceeding. During his stay in England, therefore, he is trying to arrange for the purchase of a D.H. "Moth" which he will take back with him to Australia and thus be able to "round up" his flock in no time. Mr. Daniels was formerly a pilot in the R.A.F.

Quebec Looks Ahead for Power

The forward policy of the Quebec Government in investigating its power sites in advance of requirements is drawn to public notice by the return to the base at Three Rivers of the hydroplane of Canadian Airways, Ltd., from their photographic survey of the great falls on McLean River in the newer portion of the province called Ungava. The McLean falls have a sheer drop of 302 ft. and with heavy rapids give a total drop of approximately 800 ft. The estimated horse-power of the falls is 120,000, and of the total fall for a distance of 12 miles is 300,000. The airmen report that excellent photographs demonstrating the possibilities of hydro-electric developments have been forwarded to the Minister of Lands and Forests, for whose department the survey was made.

Canoes by Aeroplane

Good use is being made of the air services by prospectors journeying into the remote parts of Northern Ontario to search for gold. So much so that one of the companies operating a "gold rush" air service is providing a machine which will carry two canoes—the canoe forming an all-important item of the gold-seeker's equipment.

Italy-Brazil by Seaplane

On October 17, Senhor de Barros, a Brazilian pilot, accompanied by Capt. Braga, Sen. Cunha, and a mechanic, left Genoa for Gibraltar in a seaplane, with the object of flying to Santos, in Brazil.

The Bristol "Cherub" Abroad

The Bristol Aeroplane Co. have recently received a communication from Herr Eberhard von Conta from Rome informing them that he had completed a trip of 1,600 kms. in his Messerschmitt Monoplane fitted with the Bristol "Cherub" Series III engine in 14 hrs. 20 mins. from Bamberg to Rome, his line of route being over Brixen, Klagenfurt, Bologna and Florence. The crossing of the Alps was effected at a height of 14,000 ft. Although this brief message contained no mention of the fact, it was understood from Herr von Conta before the flight commenced that a passenger was to be carried in the machine. This flight is certain a remarkably fine performance for an engine of the capacity of the "Cherub" to have carried out so satisfactorily, and it is an indication of the pilot's appreciation of the Cherub's qualities that the engine had already completed 65 hours' running without the changing of a plug before this trans-Alpine flight was commenced.

Captured R.A.F. Airmen Released by Arabs

Flying-Officer F. M. Denny and Aircraftsman Hirst, No. 30 (Bombing) Squadron, Royal Air Force, who were captured by Sheikh Mahmud last June, returned to the British lines on October 8 in charge of a strong escort of the Sheikh's warlike Kurds. An exchange of prisoners had been made in a remote mountain village, 40 miles south-east of Sulaimania. Both airmen looked well and said that their captor had done his best to make them comfortable, although kept under strong guard, living in a mud hut and eating Kurdish food all the time.

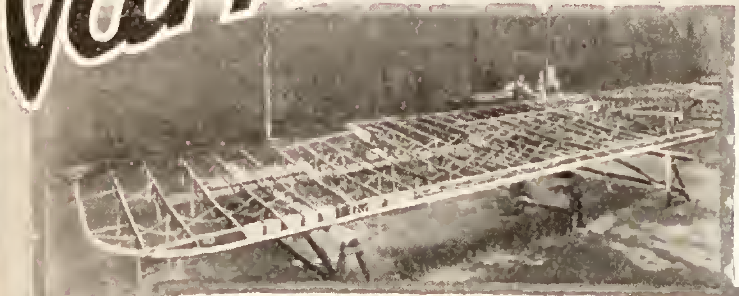
Airship Development Work

In connection with the Airship Development Programme, it is hoped to carry out at an early date some experiments with R.33 in dropping aeroplanes. It may be remembered that last year a D.H.53 light 'plane was successfully dropped and again attached. The new experiments will be more ambitious in that two machines will be carried, and will be high-power single-seater fighters (Gloster "Grebes"). Tests are also about to be carried out on parachutes modified to suit airship conditions, in which the crew have to move about the hull and cannot constantly wear both harness and parachute as is done on heavier-than-air craft. Yet a third set of experiments will consist in determining the accuracy with which the height of an airship can be determined from a timing of the echo of small explosives fired from the airship. It will be recalled that one of our early rigid airships successfully launched a Sopwith "Camel" as far back as 1919.

Changes at Hawkers

Mr. T. S. Spriggs, director and secretary of the H. G. Hawker Engineering Co., Ltd., has been appointed General Manager, and Mr. H. Chandler has been promoted to Secretary. Congratulations to all concerned!

Varnishes, Paints & Enamels for AEROPLANES



Oct. 8, 1924.

". . . One of our twin-engined W.8 machines, which has been used on the London-Paris Service for the last three years and done 1,500 hours of flying, has just been returned to our Works for inspection and overhaul. The whole of the woodwork inside the planes, which have had their fabric removed, is varnished with your material. It will probably be of interest to you, therefore, from a publicity point of view to see the state of the varnish at the end of this period, the surface of the varnish being practically as good as new, except in one or two places where moisture has collected."—(*Signed*) HANDLEY PAGE, LTD.

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MANY people may not realise that the same Armstrong-Siddeley engine fitted to Sir Alan Cobham's De Havilland aeroplane was flown both in his 28,000 miles England—Australia—England flight just completed, and in his flight to the Cape and back last winter.

Thus this engine has covered in these two flights alone 44,000 miles, passing through the intense heat of the equatorial zone four times.

Undoubtedly the lubricant used throughout these flights contributed to the engine's trouble-free running. It was a standard grade of—

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SIR ALAN J. COBHAM'S

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in which he made his historic

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making ***45,000*** Miles with the same

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THE ROYAL AIR FORCE

London Gazette, October 12, 1926.

General Duties Branch

H. Broadhurst is granted a short-service commission as a Pilot Officer on probation, with effect from and with seniority of October 1. The follg. Pilot Officers are promoted to rank of Flying Officer :—N. S. Little (Aug. 16) ; E. L. Drew (Aug. 17) ; G. P. Mee (Sept. 6) ; P. B. Chubh (Sept. 6) ; D. C. Shaw (Sept. 17). The follg. Pilot Officers on probation are confirmed in rank :—J. McGuinness, G. E. Campbell, D.F.M., A. H. Owen (Sept. 1) ; M. A. Cowan (Sept. 10) ; J. H. Harris (Sept. 13) ; Pilot Officer J. C. H. Tavendale takes rank and prec. as if his appt. as Pilot Officer bore date Dec. 17, 1924, immediately follg. Pilot Officer J. G. Franks on the gradation list. Reduction to take effect from Aug. 23. Pilot Officer M. H. Frame resigns his short-service commn. (Oct. 4).

Stores Branch

Flying Officer J. E. Truss, M.C., is granted a permanent commn. in this rank (Oct. 13) ; Flying Officer C. S. Whellock is transfd. to Stores Branch on probn. in this rank, with effect from and with seny. of Oct. 1 ; Flight Lieut. E. R. Wcbb relinquishes his short-service commn. on acct. of ill-health, and is permitted to retain his rank (Oct. 10).

Medical Branch

Sqdn. Leader B. F. Beatson, D.T.M., is placed on retd. list at his own request (Oct. 13) ; Flight Lieut. H. R. Peek (tempy. Capt. Army Dental Surgeon), relinquished his temp. commn. on return to Army duty (Sept. 20).

Memorandum

Maj. R. Hall, O.B.E., late The R. Welch Fus., is granted permission to retain rank of Lieut.-Col., R.A.F., on retirement from the Army.

Reserve of Air Force Officers

The follg. are granted commns. on probn. in the General Duties Branch, in the ranks stated (Oct. 12) :—

Class A.—Flying Officer C. W. Carlcton, A.F.C. Pilot Officer M. T. Bromley.

Class BB.—Pilot Officer J. P. James.

The follg. Pilot Officers are confirmed in rank :—J. Hill, C. W. Lofthouse, R. G. Shaw (Oct. 5) ; C. W. Carter (Oct. 6) ; H. S. Fulton (Oct. 7). Flying Officer W. J. Buchanan, D.F.C., is transferred from Class A to Class C (September 6).

The follg. Flying Officers relinquish their commns. on completion of service : J. Fairbairn (Aug. 28) ; S. C. Rose (Sept. 12) ; W. J. Sivewright (Sept. 12) ; G. L. G. Watson, M.M. (Sept. 19) ; H. Hoad (Oct. 10). The commn. of Pilot Officer on probn. G. W. Phillips is terminated on cessation of duty (Sept. 21).

Princess Mary's R.A.F. Nursing Service

Miss E. M. Burton resigns her appt. as Sister (Aug. 19).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Squadron Leaders : R. H. M. S. Saundby, M.C., D.F.C., A.F.C., to No. 58 Sqdn., Worthy Down, on transfer to Home Estab. ; 15.10.26. R. Halley, D.F.C., A.F.C., to H.Q., Cranwell; 1.10.26. L. C. Keeble, to H.M.S. *Hermes* ; 7.10.26. G. H. P. Padley, to Central Flying Sch., Upavon ; 4.10.26. L. F. Forbes, M.C., to No. 7 Sqdn., Bircham Newton ; 11.10.26. H. I. Hanmer, D.F.C., to No. 13 Sqdn., Andover ; 1.10.26. W. Sowrey, D.F.C., A.F.C., to No. 2 Sqdn., Manston ; 1.10.26.

Flight Lieutenants : F. Beaumont, to R.A.F. Depot, Uxbridge ; 11.10.26. J. F. Lawson, A.F.C., to Heliopolis Details, Egypt ; 21.9.26. W. S. Allen, to H.Q., No. 21 Group, West Drayton ; 7.10.26. F. W. Walker, D.S.C., A.F.C., to School of Naval Co-operation, Lee-on-Solent ; 4.10.26. S. M. Kinkead, D.S.O., D.S.C., D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab. ; 27.9.26. S. L. G. Pope, D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab. ; 27.9.26.

Flying Officers : E. F. Haylock, to No. 503 Sqdn., Waddington ; 12.10.26. C. Sutton, to R.A.F. Depot, Uxbridge, on transfer to Home Estab. ; 19.9.26. R. L. Yates, to R.A.F. Depot, Uxbridge, on transfer to Home Estab. ; 11.9.26. R. F. Overbury, to R.A.F. Depot, Uxbridge, on transfer to Home Estab. ; 21.9.26. (Hon. Flight-Lieut.) G. Anderson, to R.A.F. Depot, Uxbridge ; 11.10.26. J. A. Mollison, to Electrical and Wireless Sch., Flowerdown ; 13.10.26. G. J. Gaynor, to Elec. and Wireless Sch., Flowerdown ; 8.10.26. C. F. Caunter, to Station H.Q., Northolt ; 11.10.26. A. H. Whcelcr, to No. 111 Sqdn., Duxford ; 18.10.26. H. R. McL. Reid, D.F.C., to R.A.F. Cadet College, Cranwell ; 12.10.26. C. F. H. Grace, to Home Aircraft Depot, Henlow ; 15.10.26. E. A. H. Fisher and I. W. C. Mackenzie, to Armament and Gunnery Sch., Eastchurch ; 12.10.26.

Pilot Officers : C. Pitt-Hardacre, to R.A.F. Depot, Uxbridge, on transfer to Home Estab. ; 4.10.26. H. Broadhurst, to No. 11 Sqdn., Netheravon, on appointment to a Short Service Commn. ; 1.10.26.

Stores Branch

Flight Lieutenants : J. Lundon, to Station H.Q., Upavon, 6.9.26. W. J. King, D.C.M., to No. 21 Group H.Q., West Drayton, on transfer to Home Estab., 11.10.26.

Flying Officers : L. V. Hirst, J. R. R. Harvcy, J. W. Hustwaite, M. F. Tomkins and L. W. Park, to School of Store Accounting and Storekeeping, Kidbrooke, 1.10.26. J. W. Mitchell, to School of Store Accounting and Storekeeping, Kidbrooke, 30.9.26.

Flying Officers : C. B. Horsfield, to R.A.F. Training Base, Lcuchars, 3.9.26. A. G. S. Tuke, to H.M.S. *Hermes* ; 7.10.26. L. Horwood, M.C., to Marine Aircraft Experimental Estab., Fclixstowe ; 8.10.26.

Pilot Officer L. F. Cauntcr, to No. 4 Sqdn., S. Farnhorough, 14.9.26.

Pilot Officers : The undermentioned Pilot Officers are posted to H.Q., R.A.F., Cranwell, on appointment to Permanent Commns. (on probation), with effect from 9.10.26 :—J. E. R. Sowman, O. W. T. Rogers, A. A. Quaylc, W. A. D. Collingwood, M. S. Shapcott, C. I. Fry, R. B. Horstmann, R. B. Brown, R. S. Sawycr, T. I. Iliff, W. A. Stagg, C. J. Nohbs, H. D. Jackman, E. H. Walker, E. G. Northway, and W. G. S. Wood.

Medical Branch

Flight Lieutenant (Dental) : E. A. Wheeler, to R.A.F. Depot, Uxbridge, on appointment to a Temp. Commn. ; 1.10.26.

Flying Officers : N. I. Smith, M.B., to Research Lab. and Medical Officers' Sch. of Instruction ; 8.10.26. H. Penman, M.B., to Research Lab. and Medical Officers' Sch. of Instruction, on appointment to a Short Service Commn. ; 8.10.26. E. A. Rice, M.B., to Aeroplane and Armament Experimental Estab., Martlesham Heath ; 3.10.26.

Chaplains' Branch

Rev. A. W. Brown, M.A., B.D., to Station H.Q., Upavon ; 7.10.26. Rev. W. T. Rees, B.D., to H.Q., Egypt ; 21.9.26. Rev. G. A. Davies, B.A., to Home Aircraft Depot, Henlow, on transfer to Home Estabt. ; 21.10.26.

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Showing the Red Flag by Air : Soviet Russia is making every effort not to lag behind in the world of aeronautics, and recently the Russian pilot, Capt. Gromov, accompanied by his mechanic, Radzevich, made a tour of Europe in a Russian-built biplane fitted with a Napier " Lion " engine. They left Moscow on August 31 and flew to Konigsberg, Berlin, Paris, Rome, Vienna, Prague, Warsaw, and back to Moscow (September 3.) Our picture shows the machine at Rome. The " Ant," as the machine is called, is of all-metal construction, and maintained an average speed of 115 m.p.h. over the 4,350 miles.

A De Havilland "Moth" for the Rajah of Bhong: Mr. George Graves visits "the aeroplane shop" in New Bond Street, London, W., in his 18-50 h.p. Crossley "Six," to buy a De Havilland "Moth" for his old friend, the Rajah of Bhong. On Mr. Graves' right are Mr. A. Melvin Robertson, sales manager to Crossley Motors, Ltd., and Mr. S. T. Lea. On his left is Mr. J. H. Adams, in his day a famous cyclist, the holder of a record number of championships and records, and now averaging 2,500 miles per week on British roads in the interests of Crossley Motors, Ltd.

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LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The weather was responsible for three blank days during the past week. Full advantage, however, was taken on Saturday and Sunday when the conditions were ideal. On Sunday 42 members took the air, of which 17 made solo flights. During the week-end the Club was assisted in instructional flying by Mr. R. W. Reeve, of the "D.H" school. The total flying for the week was 34 hrs. 5 mins.

The following Members had instruction:—G. C. Bonner, T. C. Sharwood, E. K. Blyth, Miss O'Brien, O. J. Marstrand, E. J. B. King, G. H. Saxon Mills, J. H. Saffery, L. Lester, H. M. Samuelson, Miss Fletcher, V. H. Doree, N. H. Jones, L. Martin, H. Solomon, S. C. Richards, T. L. Gardner, Sir John Rhodes, H. Kennedy, F. Clarkson, F. C. Elford, G. N. Howe, A. S. Richardson, W. L.S. McLeod, H. Spooner, M. P. Susman, J. J. Hofer, H. R. Presland, J. G. Crammond, R. A. St. John, L. G. Sykes.

The following Members made solo flights:—E. K. Blyth, Miss O'Brien, E. L. O. Baddeley, Mrs. S. C. Eliott-Lynn, K. V. Wright, O. J. Tapper, A. R. Ogston, Major K. M. Beaumont, E. E. Stammers, W. Hay, J. H. Saffery, N. H. Jones, G. H. Craig, J. Barros, A. Lees, E. S. Brough, A. G. D. Alderson, N. J. Hulbert, H. Kennedy, H. Petre, W. Roche-Kelly. The following Associate Members had joy rides:—R. Andrews, Mrs. Woods Humphrey, Master Hay, L. C. Davey, G. H. Weston.

The following Members have received permission to carry passengers:—A. G. D. Alderson, Major K. M. Beaumont, W. T. Hay, N. H. Jones, L. J. C. Mitchell.

It is now possible to give more joy rides to Associate Members, and it is hoped that Associate Members will now visit the Aerodrome more frequently. On Sunday E. K. Blyth carried out the tests for his Aviator's Certificate.

The Hampshire Aeroplane Club

Report for week ending October 14:—

Total flying time, 7 hrs. 33 mins; instruction flying, 6 hrs. 5 mins.; passenger flying, 48 mins.; solo flying, 40 mins.

The following members received instruction:—Lieut. Graham, R.N., 1 hr. 20 mins.; Messrs. Perfect, 40 mins.; Rumble, 30 mins.; Stokes, 30 mins.; Shepherd, 25 mins.; Courtney, 20 mins.; Bound, 20 mins.; Van den Bergh; 20 mins.; Kerry, 15 mins.; Westbrook, 15 mins.; Cooper, 15 mins.; Heathcotte, 15 mins.; Maloney, 15 mins.; Miss Home, 15 mins.; Nicholson, 10 mins.

The following members received passenger flights:—Mrs. M. Wood, Mrs. D. Wood, and Mr. Massey.

The following members flew solo:—Mr. O. E. Simmonds, F/O. Clarkson, Messrs. Perfect and Bowen.

No flying was possible on Saturday owing to a hurricane.

On Tuesday of last week Mr. R. V. Perfect, the hard-working Hon. Secretary of the club, successfully flew his first solo as recorded above. In view of the terrific amount of secretarial work involved in the running of the club, it is difficult to imagine when he has foun time to learn to fly.

The Lancashire Aero Club

Report for week ending October 15:—The weather permitted flying on Sunday afternoon. Total time for week, 3 hrs. 40 mins., made up as follows:—

Dual with Mr. Scholes: Cohen, 20 mins.; Moore, 15 mins.; Blagden, 15 mins.; Newton, 10 mins.; Shires 10 mins.

Solo: Leeming, 45 mins.; Pitman, 45 mins.; Lacayo, 30 mins.; Williams, 10 mins.; test, 5 mins.

This record total seems to give the signal for an annual report in the approved style, thus:

The club has now completed a year's flying as one of the six clubs originally approved of by the Air Ministry. Several flights have been made and the total distance flown (reckoning the average height of the aerodrome at 242 ft., a.s.l. and the barometer steady at "stormy" throughout, and correcting the air-speed indicator readings accordingly) is approximately 59,333 miles, 587 yards. In addition, owing to the direction of the prevailing wind, a distance of 3,019 miles, one rod, pole or perch has been covered on the deck.

It is very satisfactory to be able to place on record that there have only been four crashes—one from mental defect, one from loss of direction (when taking off), and two from the pilot losing his speed in the air.

Giving the Gosport's Mono engine credit for an average of 850 r.p.m., and including starting up on cold mornings, it is estimated that the club's engines have revolved approximately 1,612,948¼ times and no mechanical trouble has been experienced except through engines refusing, or ceasing, to function in a normal manner. In the same way, nothing larger than a wheel, or the pilot's hat, has ever fallen off any of the machines while in flight. (These facts reflect considerable credit on the ground staff.) During the whole period no instructor has been injured. (This reflects the greatest credit on the pupils.)

Among the club's successes at the various meetings held may be mentioned the following:—Gifts of aeroplanes by Sir C. C. Wakefield, Bart., the Directors of A. V. Roe and Co and Colonel Darby, and the petrol distributing companies. Licence for use of aerodrome obtained after prolonged combat between opposing forces of solicitors with heavy casualties on both sides. Promise of an aeroplane from Mr. Sydney Norris. Promise of substantial help from Colonel Groves. That's all, except perhaps that a number of people have been taught to fly and are doing so, in spite of their friends' advice.

The Newcastle-upon-Tyne Aero Club

Flying report for week ending October 17:—Owing to the absence of Mr. Brown, flying has been impossible during the week, but he is now back to the club and better things are hoped for during the next week.

The Midland Aero Club

Report for week ending October 16:—Very bad weather, accompanied by high winds, considerably restricted flying during the week. Total flying time was 4 hrs. 43 mins. The following members were given dual instruction: C. Fellowes, S. H. Smith, E. J. Brighton, A. B. Gibbons.

The following members made solo flights:—R. L. Jackson, E. J. Brighton, J. Brinton, G. Perry, W. Swann, H. Willis.

⁂

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor
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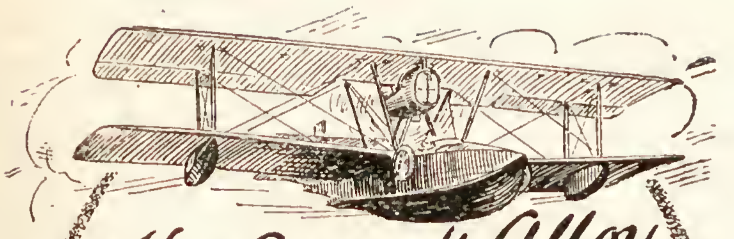

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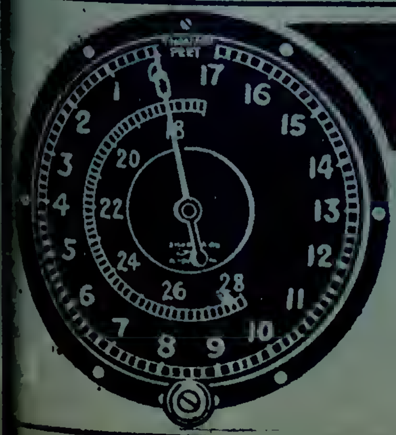

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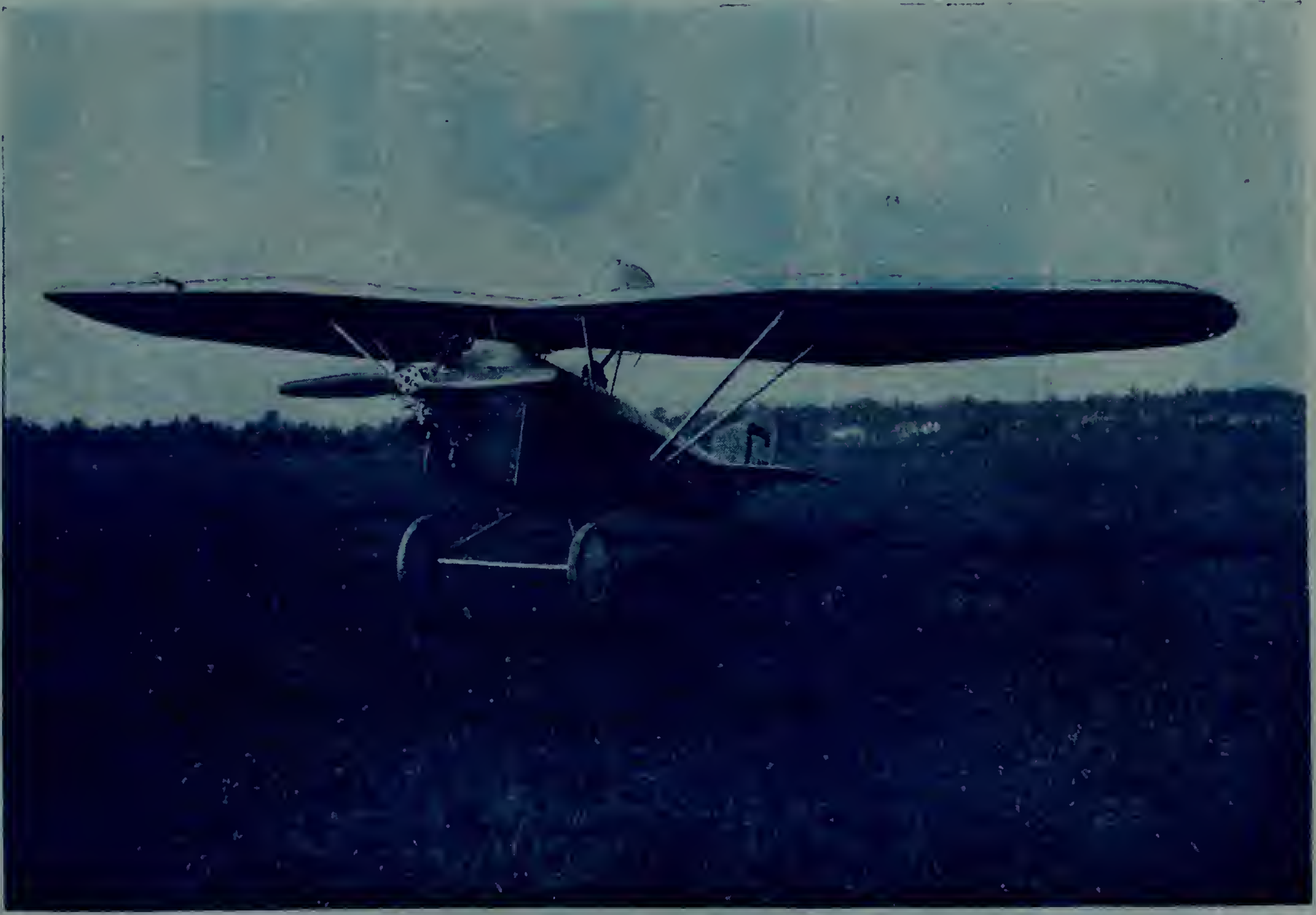

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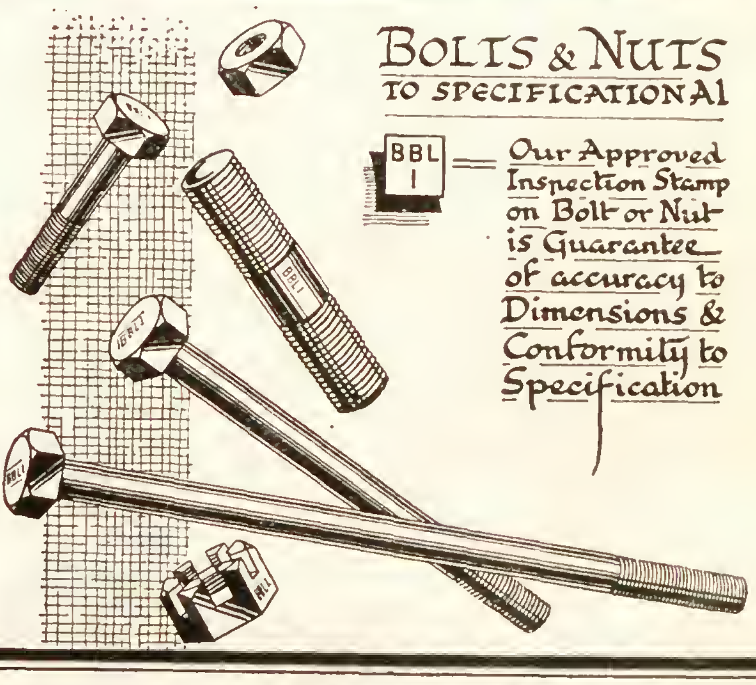

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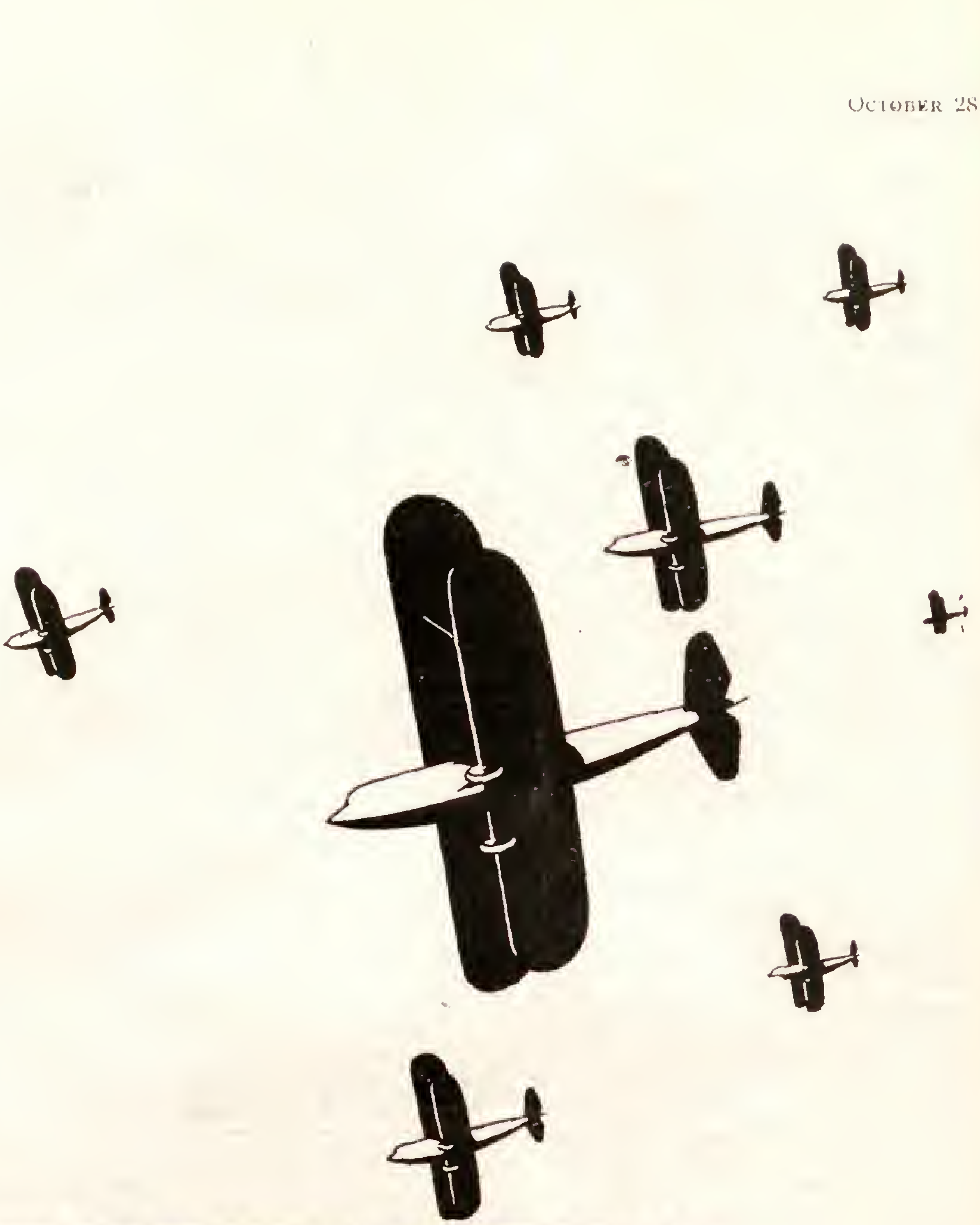

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Nov. 4	Mr. G. F. Mucklow. "Hydrogen as an Auxiliary Fuel for a Solid Injection Engine." Joint Meeting R.Ae.S. and Inst.A.E.
Nov. 11	Schneider Cup Race at Norfolk, Virginia, U.S.A.
Nov. 16	Mr. A. G. von Baumhauer, Sub-Director of the Government Aeronautical Laboratories, Amsterdam. "Some Notes on the Possibilities of Progress in Aviation," before Inst.Ae.E.
Nov. 18	Mr. R. S. Capon. "Methods of Performance Testing and Analysis," before R.Ae.S.
Nov. 21	Lecture, "Meteorology in the Service of Man," by Dr. G. C. Simpson, C.B., at the Guildhouse, Eccleston Square, S.W.1.
Nov. 30	Mr. F. S. Barton, M.A., F.Inst.P. "Air Photography Apparatus," before Inst.Ae.E.
Dec. 2	Mr. P. B. Bradshaw. "Alloy Steels for Aero Work," before R.Ae.S.
Dec. 3-19	Paris Aero Show

EDITORIAL COMMENT.

Breaking New Ground

NOTHING is more refreshing, when one has been submerged, as it were, in a set of problems along accepted lines, than suddenly to have sprung upon one an entirely new view-point opening up fresh fields for thought and contemplation. The paper read by Mr. G. H. Dowty before the Institution of Aeronautical Engineers on October 26 was in the nature of such a surprise, at any rate that part of his paper which dealt with what he termed "Arrester gears." When one comes to think of it, it is rather amazing, as Dr. Thurston pointed out during the discussion, that although we have made great strides as regards aeroplanes in the air, when it comes to alighting we are very much where we were in the earliest days of flying. One might even compare an aeroplane with a motor-car without brakes. Such a thing would appear quite ridiculous; yet that is roughly the position as regards the aeroplane attempting to land, and this in spite of the fact that the aeroplane, with its relatively greater speed, would seem to be even more in need of braking devices than any other form of vehicle. Yet we have continued to rest content with relying upon the deceleration due to the air forces on the aeroplane, and to the—fairly small—frictional resistance due to undercarriage and tail skid. Wheel brakes have been tried, it is true, but not with any great success, mainly, probably, because if the retarding effect of the brakes is to be worth while, there is a good deal of risk of locking the wheels and standing the machine on its nose. Mr. Dowty's suggestion of an arrester gear, capable of pulling a machine up in something like 300 ft., no matter, within reason, what its speed, is therefore interesting, to say the least of it.

We are aware, of course, that something of the sort has been tried in America with a certain amount of success, but we gather that during the first attempts, which were admittedly made with somewhat crude apparatus, the brake mechanism seized, the aeroplane stopped suddenly, and the pilot went on! In the American experiment a light pole was suspended from the aeroplane at an angle, and carried at its free end a hook or grapnel arrangement, which was fastened to the pole in such a manner that quite a small pull on the hook pulled it off the pole, which then swung up against the bottom of the fuselage, while the hook, which was attached to a cable, engaged with cross ropes on the ground, and stretched a cable secured to the machine itself. In principle, the idea appears identical with that suggested by Mr. Dowty, although doubtless the details were somewhat different.

The crux of the whole matter would appear to be, as stated by Mr. Dowty, to devise some form of brake drum which will have a very low resistance at first, the resistance gradually increasing to a maximum and then remaining permanent to the end of the stroke. At the same time such a brake mechanism must be able automatically to adapt itself to various speeds of alighting. One way of attaining this end was illustrated at Mr. Dowty's lecture, but it cannot be said that this represented other than a very roundabout way of attaining the desired end. Doubtless this was due to the fact that Mr. Dowty is patenting, in connection with the Gloucestershire Aircraft Company, a more recent form of brake drum, which may be assumed to be a good deal simpler. At any rate, the difficulties of designing some form of brake drum with these characteristics should certainly not be insuperable, and if the scheme is found worth while developing there is no reason to doubt that several forms of brake drum will be produced.

In the absence of actual experiments it is difficult to decide definitely what are the uses to which such an arresting gear might be put. Certain fundamental considerations do, however, arise. The obvious use, and the one to which Mr. Dowty particularly referred, is, of course, in connection with deck landing. As was pointed out, the difficulties of deck landing under present conditions result in the use, for this purpose, of machines with a relatively low stalling speed, and consequently with a somewhat impaired top speed thus needlessly (needlessly, that is, if the arrester gear can be evolved successfully) handicapping the machines used for operating from shipboard. If it should prove feasible to arrest machines coming in at 80 knots or more, then evidently aircraft with a much higher all-round performance could be used. Fundamentally, there does not appear to be any reason to believe that the problems cannot be solved, and it is, to our way of thinking, in connection with deck landing that the arrester gear is likely to have its greatest utility. The scheme certainly seems promising, and is, we think, deserving of very serious consideration by the Government departments most directly concerned.

The author of the paper also suggested that the device might be of use in connection with Army aeroplanes in that it would enable the machines to alight in very confined spaces, which might be of great advantage during a war over country where large aerodromes were not easily established. To us it seems rather doubtful whether this would really be so. It should be remembered that if the presence of an arrester gear at the base were made the excuse for putting up the landing speed of machines, then, in case of a forced landing, pilots used to landing "engine on" would be very likely to crash if compelled to alight without their engine in confined areas.

Mr. Dowty's suggestion of the uses of the arrester gear for commercial machines seems to us to suffer from very much the same disadvantages, plus the fact that the size of aerodromes for machines of commercial type is determined not so much by the size of field into which a machine can be brought safely, as the size of field out of which a machine can be flown. In other words, for machines of this type it is the take-off rather than the landing which determines the size of field.

Taking it all round, it seems to us that it is in connection with deck landing that the arrester gear is most likely to be of service, and there we believe it to have very great possibilities indeed, and worthy of the most serious consideration. At any rate, Mr. Dowty has given us something to think about.

◆ ◆ ◆ ◆

Duke of York's Message to Royal Aeronautical Society

The Royal Aeronautical Society held a reception to the Dominion Prime Ministers and delegates to the Imperial Conference on October 25, at which some 400 guests were received by the President of the Society, Air Vice-Marshal Sir Sefton Brancker. The following letter from the Duke of York, addressed to Sir Sefton Brancker, was read:—

"I very much regret that I will be unable to be present at the Royal Aeronautical Society's reception on October 25.

"I am proud to feel that the Prince of Wales and I share between us the honour of being patrons of the oldest aeronautical body in the world, and it would have given me the greatest satisfaction to be able to attend the reception.

"The work of the Society is growing constantly in magnitude and importance. Its position can be maintained and improved only if all those connected either directly or indirectly with aeronautics give their fullest support. The munificent gift by the Guggenheim Trust Fund of the U.S.A. will in a measure enable the scope of the Society's activities to be widened, and I hope that those public-spirited persons or bodies who have in the past done so much to help forward our other great societies will give assistance so that a substantial Endowment Fund may be established.—Yours sincerely,

"Albert."

Sir Alan Cobham Still Busy

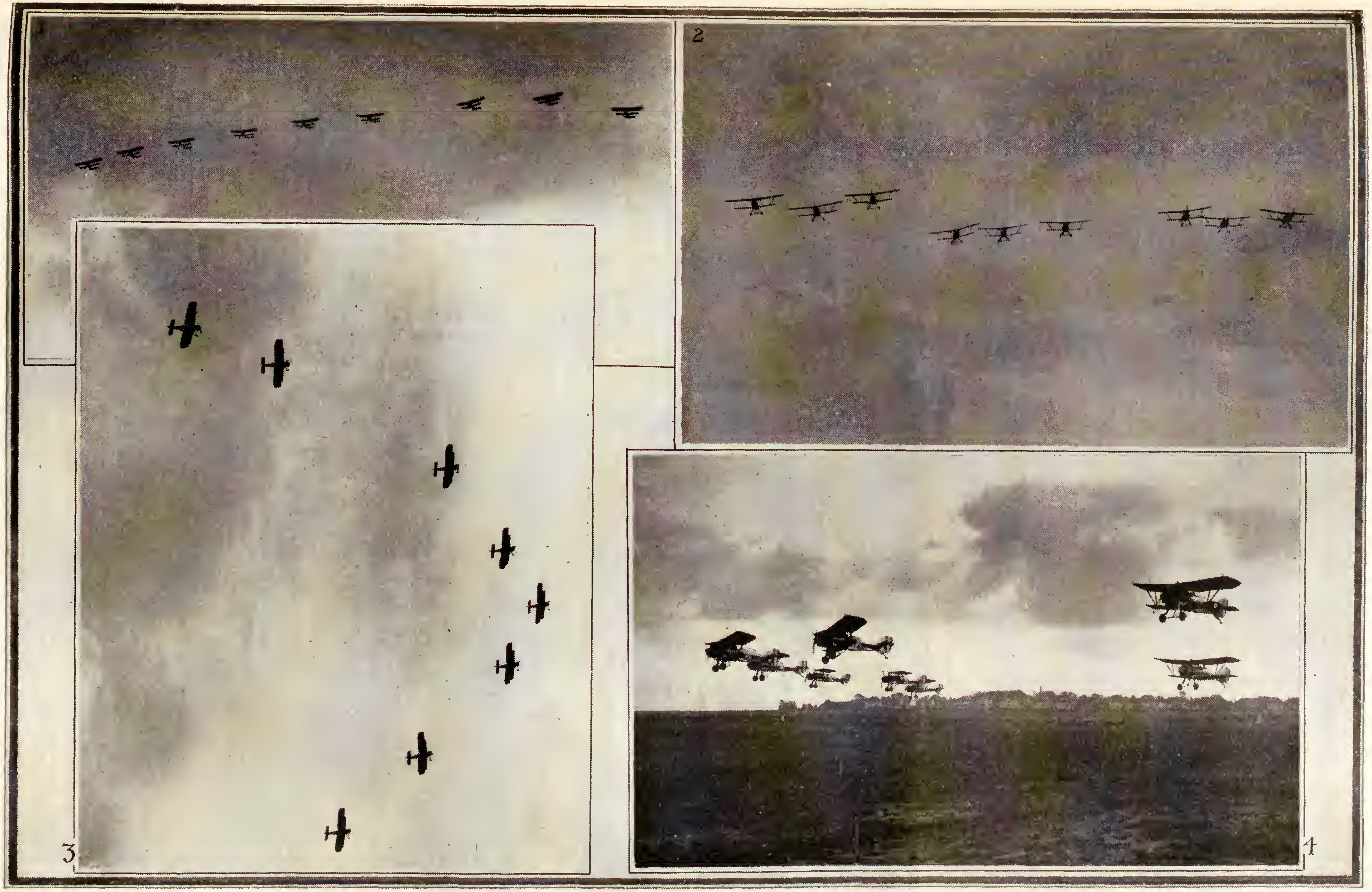
On October 22 Sir Alan Cobham was entertained at luncheon at the Café Royal by the Foreign Press Association, Air Vice-Marshal Sir Sefton Brancker, Sir Joseph Cook (Agent-General for Australia) and Lady Cobham being present.

Sir Alan, with Lady Cobham as passenger, flew in a D.H. "Moth" from London to the Seven Sisters Cliffs, Eastbourne, where he made an appeal on behalf of the Seven Sisters Cliffs Preservation Fund—this beauty spot being threatened by a building scheme. After auctioning various articles, Sir Alan then sold handshakes for 5*s.* each. Altogether, it is estimated that Sir Alan's visit resulted in more than £500 being subscribed.

On October 25 Sir Alan was present at a reception given by the Royal Aeronautical Society to the Dominion Prime Ministers, when it was announced that he had been made an Honorary Fellow of the Society, and that Sergt. Ward and Mr. Capel had been made life associates.

The Late Mr. E. T. Willows

It has been decided by a number of fellow aeronauts and friends of Mr. E. T Willows, the airship pioneer, who was recently fatally injured at Bedford, to make an attempt to raise a fund to assist Mrs. Willows and her three children, who are left without any means whatever. C. G. Spencer and Sons, Ltd., have promised a contribution of 100 guineas. Donations may be sent direct to Midland Bank, Ltd., 431, Oxford Street, London, and crossed "Willows' Fund Committee," or to the Hon. Secretary, Mrs. Sydney R. Hibbard, 14, Eton Villas, Hampstead, N.W.3.



[" FLIGHT " *Photographs*

AIR MANŒUVRES BY RADIO-TELEPHONY : One of the most impressive sights at the Croydon Demonstration was the squadron drill carried out by pilots of No. 41 (Fighter) Squadron, Northolt, on Armstrong-Whitworth " Siskins " with Armstrong-Siddeley " Jaguar " engines. Our photographs show the machines in (1) line abreast, (2) flight mass-line abreast, and (3) squadron formation ; (4) shows the machines taking off in formation. The manœuvres were rendered more difficult by a strong gusty wind.

CROYDON AIR DEMONSTRATION

Impressive Spectacle Staged before Dominion Representatives

Although many of our latest types of aircraft were absent from the demonstration given at Croydon on Saturday last for the benefit of the Dominion representatives gathered in London for the Imperial Conference, there can be not the slightest doubt that the display gave a picture of very considerable progress made in the science and art of aviation since the last demonstration of this kind. This progress was traceable, as regards flying material, more on the civilian than on the Service side, but this was due to the fact that whereas all but one of our commercial types of aeroplanes were present at the demonstration, a number of new types of Service aircraft were absent for one reason or another. On the other hand the flying displays given demonstrated the very great strides that have been made of recent years in the handling of aircraft by Service pilots and the display given by piolts of 41 Squadron of air manœuvres by radio-telephony cannot have failed to impress our Dominion visitors, although the strong gusty wind which was blowing at the time rendered the work of the pilots a good deal more difficult than it would have been in calmer weather.

The Dominion Ministers and High Commissioners and other visitors were received by the Secretary of State for Air, Sir Samuel Hoare, and by Air Chief Marshal Sir Hugh Trenchard, who were accompanied by Sir Philip Sassoon, Under-Secretary of State for Air, the Right Hon. Winston Churchill, the Right Hon. L. S. Amery and Mrs. Amery, Air Marshal Sir John Salmond, Air Vice-Marshal Sir Geoffrey Salmond and Lady Salmond, and Air Vice-Marshal Sir Sefton Brancker, Director of Civil Aviation. The day was by no means an ideal one for such a demonstration, a cold north-easterly wind blowing right across the aerodrome, the direction being such that it was impossible to find shelter from it anywhere. It is estimated that some 200 visitors attended the demonstration, as the guests of the Government Hospitality Fund. Upon arrival at the aerodrome it was found that a large number of different types of aircraft, ranging in size and power from the small two-seater light 'plane to the largest three-engined commercial aircraft, were lined up in the aircraft "park." and the first item of the day's programme was an inspection of all these. In the case of the Service types the pilots and crews of the machines were standing by in order to give to the visitors any explanation which might be required. The visitors grouped themselves into smaller parties and commenced making the round of the machines. Mr. Bruce, the Australian Prime Minister, in particular, making a most thorough inspection of all the different types. One gathered the impression that Mr. Bruce is very keenly interested in and alive to the possibilities of aviation in Australia, an indication of the determination of the Commonwealth of Australia to make every possible use of the advantages which aircraft have to offer.

A complete list of the types of aircraft present at the demonstration was given in last week's issue of Flight, and so there is no need to repeat the list this week. Among some of the newer types of Service aircraft that were inspected, the following attracted considerable attention, and came in for very favourable comment by discerning visitors: in the single-seater fighter class the Hawker "Woodcock" and the Gloster "Gamecock" and "Grebe" and the Armstrong-Whitworth "Siskin." It seemed rather a pity that our four latest high-speed single-seater fighters were unable to be present, these being, of course, the Avro "Avenger," the Hawker "Hornbill," the Fairy "Firefly" and the Gloster "Gorcock." Among the single-engined day-bombers the Hawker "Horsley" with Rolls-Royce "Condor" and the Fairey "Fox" with Fairey "Felix" were particularly admired. the former for its impressive size and generally businesslike appearance, and the latter for its clean lines and absence of excrescences. A Fairey "Fawn" was decorated with an air screw projecting on a bracket from the side of the fuselage and placed horizontally, and might have given the uninitiated the impression that this machine was gradually growing into an "Autogiro" The crew in charge of the machine explained, however, that the "Fawn" was used for towing targets for anti-aircraft gunnery practice, and that the function of the windmill was to wind in the 6,000 feet of cable or so, which connects the target to the machine. When not in use the windmill was turned into a horizontal position.

The night-bombing class of aeroplanes included the Vickers "Virginia" and "Vimy" and the Handley Page "Hyderabad."

The troop-carrier class of aeroplane was represented by a Vickers "Victoria" fitted with two Napier "Lions." This machine carries, in addition to its crew, 24 fully-equipped

["Flight" *Photograph*

BRITISH MINISTERS AND THEIR DOMINION GUESTS AT CROYDON: Left to right: Sir Philip Sassoon, Under-Secretary of State for Air; Mr. Mackenzie King, Canadian Premier; the Maharajah of Burdwan; Sir Samuel Hoare, Secretary of State for Air; Mr. Bruce, Prime Minister of Australia; General Herzog, Prime Minister of South Africa; and Mr. Monroe, Premier of Newfoundland.

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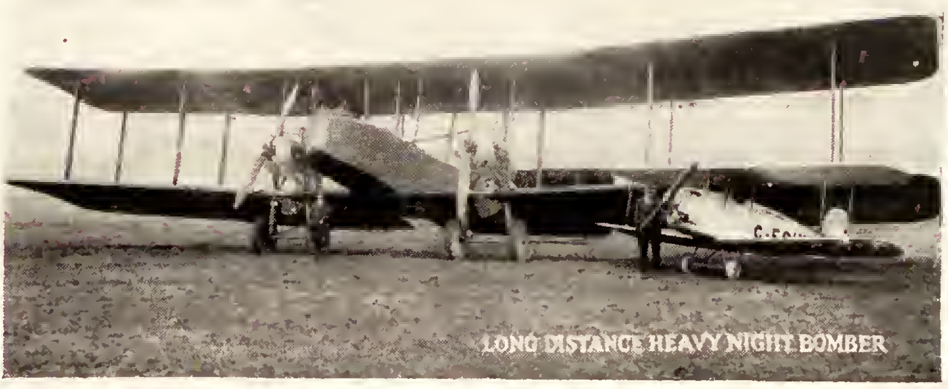

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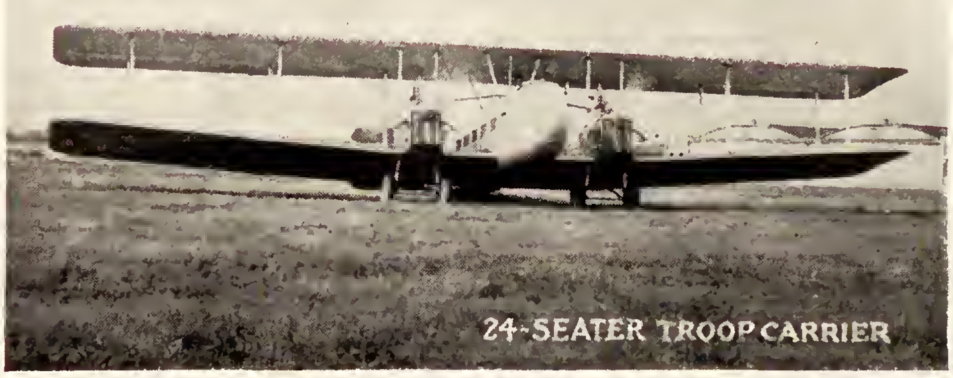

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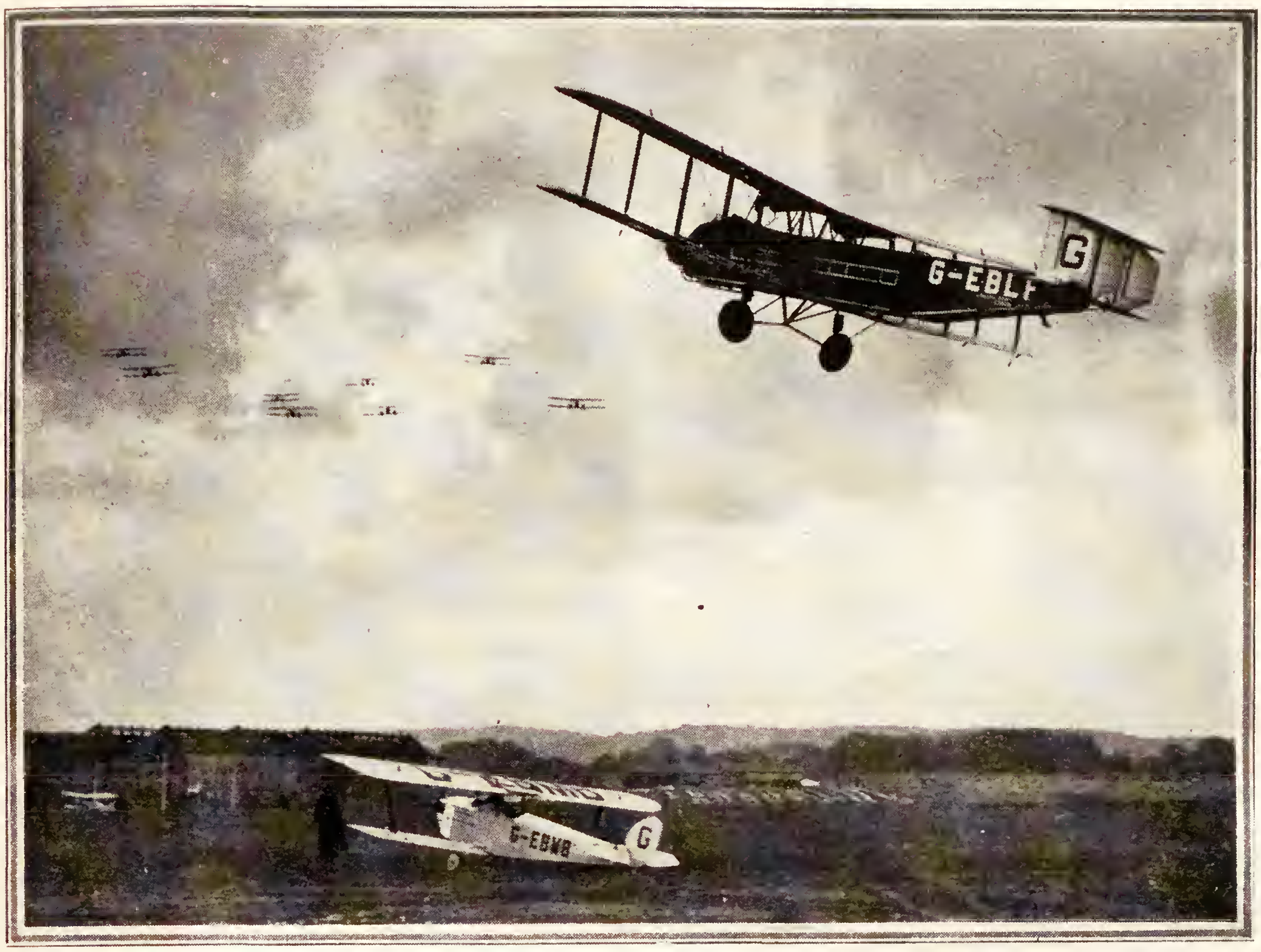


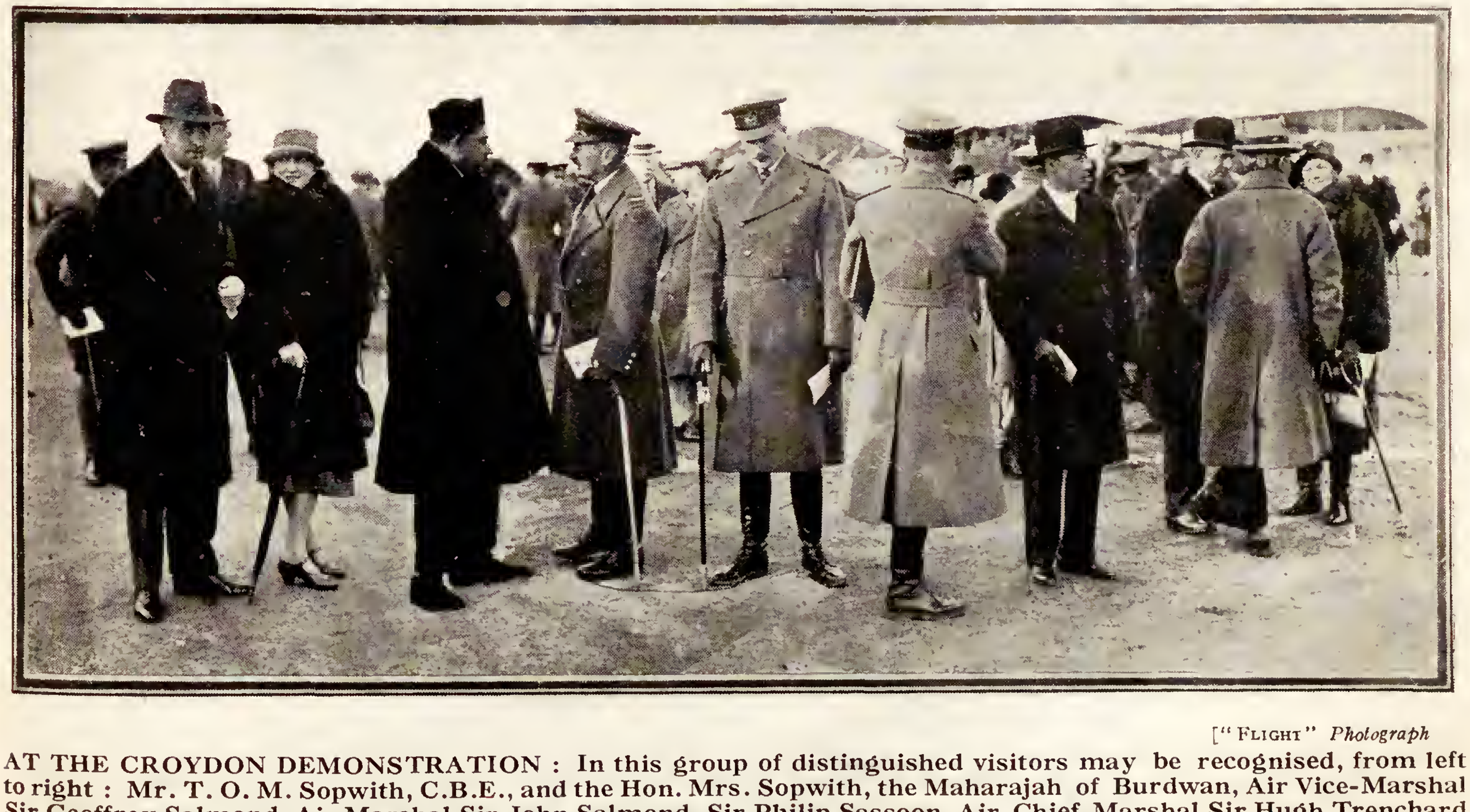
[" Flight " *Photograph*

IMPUDENCE AND DIGNITY AT THE CROYDON DEMONSTRATION : This photograph shows the Hawker "Cygnet" light 'plane taking off, with the Armstrong-Whitworth "Argosy" three-engined commercial aeroplane flying above it and a squadron of Vickers "Virginia" night bombers in the distance.

infantry men, or an equivalent weight of supplies, ammunition, etc.

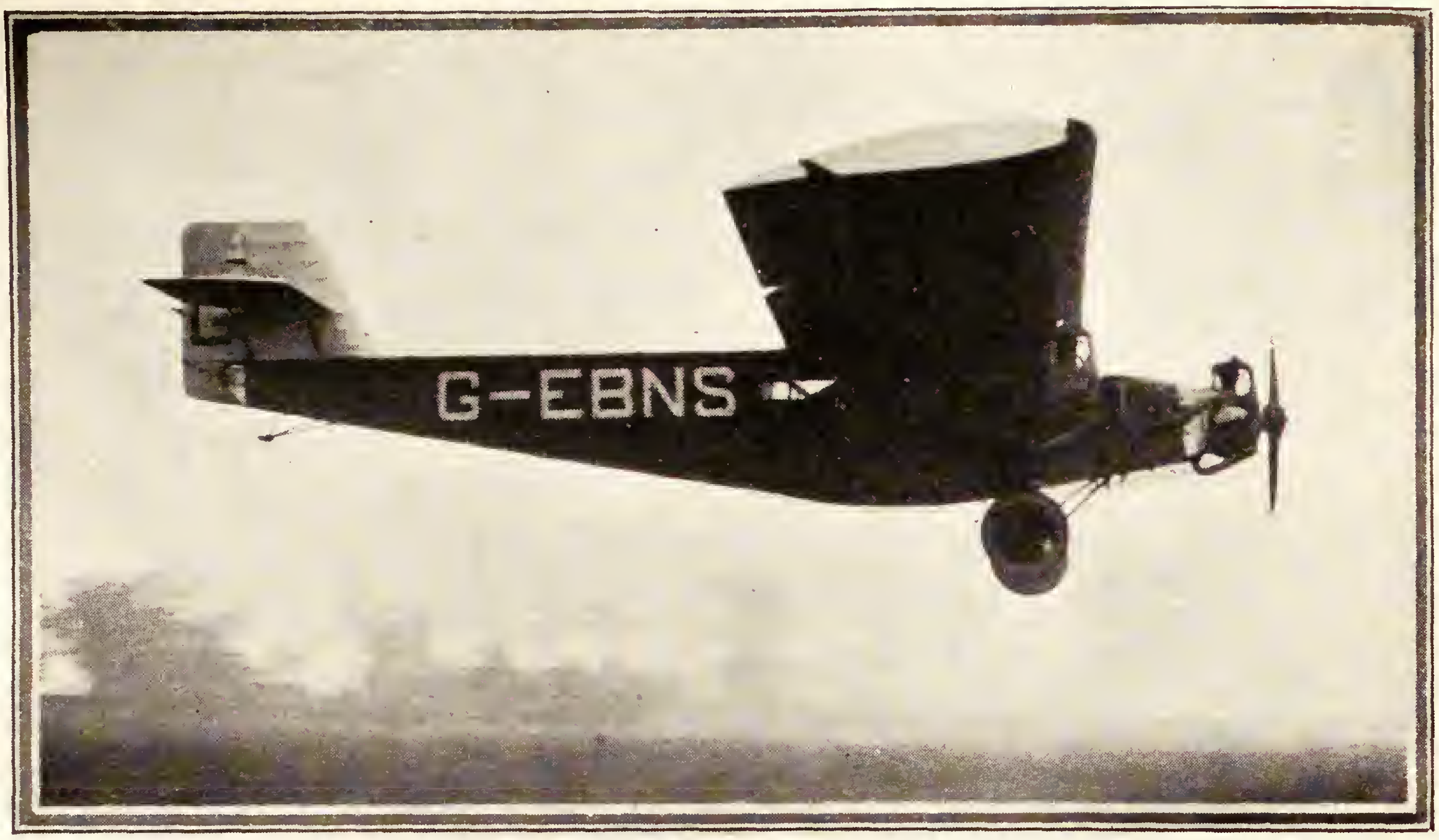
The Army co-operation type was represented by a Bristol Fighter, a type which has given many years of excellent service, but which is now we believe, to be relieved by a later type, the Armstrong-Whitworth "Atlas."

A great deal of interest was aroused by the aircraft designed for work with the Fleet Air Arm, and intended for taking off from and alighting on the deck of an aircraft carrier Among these the Blackburn "Blackburn" and the Avro "Bison," both with Napier "Lion" engines, represented a type known as Fleet gunnery spotters, whose function is to report the



[" Flight " *Photograph*

AT THE CROYDON DEMONSTRATION : In this group of distinguished visitors may be recognised, from left to right : Mr. T. O. M. Sopwith, C.B.E., and the Hon. Mrs. Sopwith, the Maharajah of Burdwan, Air Vice-Marshal Sir Geoffrey Salmond, Air Marshal Sir John Salmond, Sir Philip Sassoon, Air Chief Marshal Sir Hugh Trenchard (in background), Sir Harry Brittain, and Lady Maud Hoare.



[" Flight " *Photograph*

RETURNING FROM CROYDON : The Handley Page " Hamlet " arriving at Cricklewood after its visit to the Croydon demonstration.

accuracy or otherwise of the naval guns after the fleets have come into action. The torpedo-dropping type was represented by a Blackburn " Dart " and the reconnaissance type by the well-tried and trusty Fairey IIID, while a Fairey "Flycatcher" represented the machines intended for fighting enemy aircraft.

Among civilian types of aircraft a number of the latest types were on view, such as the three-engined Armstrong-Whitworth " Argosy," the three-engined Handley Page " Hampstead," and several types of twin-engined Handley Page commercial aeroplanes. As the latest machine to be completed, a good deal of interest naturally attached to the Handley Page " Hamlet," a small three-engined monoplane fitted with Bristol " Lucifer " engines and designed to carry, in addition to the pilot, four passengers in a comfortable cabin. This is the lowest-powered three-engined commercial machine hitherto built in this country, and is intended for use over routes where the volume of traffic is not yet such as to justify the operation of more powerful three-engined machines, but where the reliability offered by the three-engined type, capable of flying on any two of its engines, is desired. As the machine has but recently been fully described and illustrated in Flight, we need only say here that it is fitted with the Handley Page patent slotted wings. The De Havilland 50J used by Sir Alan Cobham, not only on his recent flight to Australia and back, but in many other famous flights, and which has by now flown a total distance of somewhere in the neighbourhood of 125,000 miles, was very naturally the object of a close examination by the visitors. The machine was shown in the form in which it was used over the greater portion of the flight to Australia,

[" Flight " *Photograph*

Just the thing for Australia ? : Mr. Bruce, Prime Minister of Australia, and Mrs. Bruce interested in the Handley Page " Hamlet " three-engined monoplane.

i.e., fitted with the Short Duralumin floats, which appeared to be in amazingly good condition considering the gruelling test through which they have been during the Australian flight. Among so many multi-engined types the De Havilland 54 " Highclere " stood out as the only representative of the single-engined type. This machine has a very excellent performance, and is an efficient commercial aeroplane, but owing to the policy of Imperial Airways of gradually switching over to three-engined aircraft, the machine is at present mainly being used for experimental purposes, and on Saturday it was of particular interest because of the fact that it was fitted with a gyro rudder control and pendulum aileron control. The former consists of a gyroscope, driven by compressed air, which is connected to a servo motor coupled to the rudder control. Once the gyroscope is running at full speed the pilot can set this control to any course desired, and the machine will then remain on this course almost indefinitely. For flying in fog or low clouds this device should have many advantages, and doubtless will come into general use later, when it becomes the rule to navigate above the clouds or fog over long distances. The pendulum aileron control works in conjunction with the gyro rudder control, but makes use of a pendulum in place of the gyroscope, the pendulum operating the servo motor which is coupled to the aileron control. It was greatly to be regretted that the new De Havilland 66 could not be present. The "Hercules," as this machine is called, is a three-engined commercial aeroplane fitted with three Bristol " Jupiter " engines, and is to be put in service on the Cairo-Karachi route when that comes into operation. The De Havilland Company are very busy getting the type ready for the flights to the East, which are scheduled to take place shortly, and so the machine could not be spared for the Croydon demonstration.

Finally, the series of types inspected was completed by a few two-seater light 'planes, among which was the Hawker " Cygnet " which won the recent *Daily Mail* light 'plane competition. The Avro " Avian " was also on view, and it was noted that a different rudder and small triangular fin had been substituted for the large balanced rudder fitted to the machine at Lympne. The Bristol " Brownie " and the Blackburn " Bluebird " were other Lympne types inspected, while a De Havilland " Moth " represented the type used as a standard club machine by the light aeroplane clubs, and the Westland " Widgeon " monoplane represented a high-speed type which did not, however, take part in the Lympne competition. The Short " Mussel " was exhibited with its float undercarriage, for which it was originally designed, although it can also be, and indeed has been, fitted with a wheel undercarriage for use as a land aeroplane.

Aerobatics

The first item on the programme as regards actual flying was a demonstration of aerobatics by two pilots of No. 56 (Fighter) Squadron, R.A.F., mounted on Gloster " Grebes." The official programme erroneously gave the type of machine used as an Armstrong-Whitworth " Siskin," a mistake which, it is to be feared, led to some slight confusion on the part of those visitors not intimately acquainted with British Service types. The two pilots gave an excellent demonstration of stunts such as spins, loops, rolls, etc,. the roll particularly appearing to be their favourite trick.

This event was followed by a demonstration of air manœuvres by radio-telephony, carried out by nine pilots of No. 41 (Fighter) Squadron, R.A.F., flying Armstrong-Whitworth " Siskins " (not as stated in the official programme, Gloster " Grebes "). This squadron consisted of three flights of three aeroplanes each, and the orders for the various evolutions required during the demonstration were transmitted from the ground station (whose call sign was " Martin ") to the Squadron Commander (call sign " Condor R "). The orders were acknowledged by the Squadron Commander, who in due course re-transmitted them to the flights of his squadron. The call sign of the squadron was " Condor."

The wireless telephony orders given by the ground station and by the Squadron Commander were broadcast through loud speakers on the aerodrome, so that it was possible to follow closely what was taking place. The squadron went through a series of evolutions changing from one formation to another, and generally carrying out such manœuvres as have in the past mainly been associated with the famous 25 (Fighter) Squadron. Judged solely on Saturday's demonstration, 41 Squadron was not, perhaps, quite up to the form of its famous pattern, but it should be kept in mind that the day was a very bad one for this kind of demonstration, the wind being very strong and extremely gusty, as was easily discernible even from the ground by watching the machines

["FLIGHT" Photograph

AT THE CROYDON DEMONSTRATION : Some of the machines lined up in the Aircraft park.

being buffeted about. On this occasion the Squadron Commander did not fly in the formation, but cruised around some distance away, thus obtaining always a view of the whole of the squadron. This should materially facilitate keeping an eye on the various units, and it is somewhat of a mystery how the Squadron Leader of the famous 25 Squadron manages to see what each of his pilots is doing, since to do so would appear to require telescopic and universally pivoted eyes.

The "Heavy Stuff"

Immediately the "Siskin" squadron had landed, two Air Force squadrons of Vickers "Virginias" from Nos. 7 and 9 Bombing Squadrons, flew over the aerodrome in formation. What this squadron of ten huge bombers lacked in agility it made up for by sheer weight, and it was estimated that the ten machines as they flew across the aerodrome represented something like 80 tons of matter (some of it very unpleasant matter for somebody in time of war) in the air.

The next item on the programme was a display by Mrs. Eliott-Lynn on a De Havilland "Moth." Mrs. Eliott-Lynn, whose "swan song" this was believed to be, wheeled the "Moth" out of its hangar, unfolded its wings and took the air, and after giving a series of evolutions she alighted, again folded the wings of her machine, and garaged it. In the meantime, Flight-Lieut. Bulman went up on the Hawker "Cygnet" on which he won the *Daily Mail* competition recently, while Flying Officer Ragg ascended in the R.A.E. Aero Club's "Cygnet," the two machines performing in the air together.

A number of commercial aircraft then went up carrying full loads of passengers drawn from the more distinguished visitors to the aerodrome, and it is significant that, although several more machines than those originally scheduled to give "joy rides" were pressed into service, there were long queues of people lining up for each flight. The Armstrong-Whitworth "Argosy" was the type which "did most of the trade," and the manner in which this machine leaps off the ground and climbs almost like a scout is truly amazing, this, of course, being due to the reserve of power which arises out of the fact that the machine is designed not only to fly level but to climb with any one of its three engines stopped. The Handley Page "Hamlet" also "evoluted", but it was noticed that the whole of the flying was done with the slots open, so that although one got an excellent impression of how slow this machine can fly, one was unable to form an opinion of what sort of top speed it has with slots closed, although this is believed to be distinctly good, and probably even better than the figure of 118 m.p.h. given in Flight recently.

While some of the visitors were tasting the joys of flying in modern passenger aircraft, others paid a visit to the hangars near the level crossing, where the control of aircraft operating on the cross-Channel routes as conducted in the aerodrome control tower was duplicated. A similar reproduction was made of the working of the air route meteorological service, while a very interesting exhibit was that of the Aircraft Operating Co., Ltd., and the Air Survey Co., Ltd., who illustrated the progress which has been made in air surveying. Much work has already been done by these companies in various parts of the British Empire. Thus it may be recollected that in South Burma an aerial survey of something like 15,000 square miles of forest was done in about three months' flying. By ordinary means a similar survey would, it is estimated, have taken several years. Forest stock maps were prepared on a 1-in. scale, which showed the boundaries between 13 different forest types, a subsequent check on the work carried out from the ground proving the boundaries to be very nearly as accurate as if they had been fixed by normal methods.

["Flight" *Photograph*

80 TONS OF MATTER IN THE AIR : A squadron of Vickers "Virginia" night-bombers flying over the Croydon aerodrome in formation.

At the end of the passenger flights and the inspection of the various exhibits in the hangars the machines commenced taking off for their home stations, and it was then that one had an opportunity of seeing some of our more recent Service types in flight. Particularly impressive among these was the Fairey "Fox," the Fairey "Felix" engine of which emits a most reassuring note of a character likely to be music in the ears of a pilot. This sound is quite different from any given out by any British aero engine, and without seeing this machine one could easily identify it by the sound.

As we said last week, we sincerely hope that an opportunity will be afforded the Dominion representatives of going to some seaplane station in order to see the latest development in British marine aircraft. We understand that a visit will be paid to Cardington for the purpose of studying airship work, and we trust that time and opportunity may be found also for a visit to a seaplane station.

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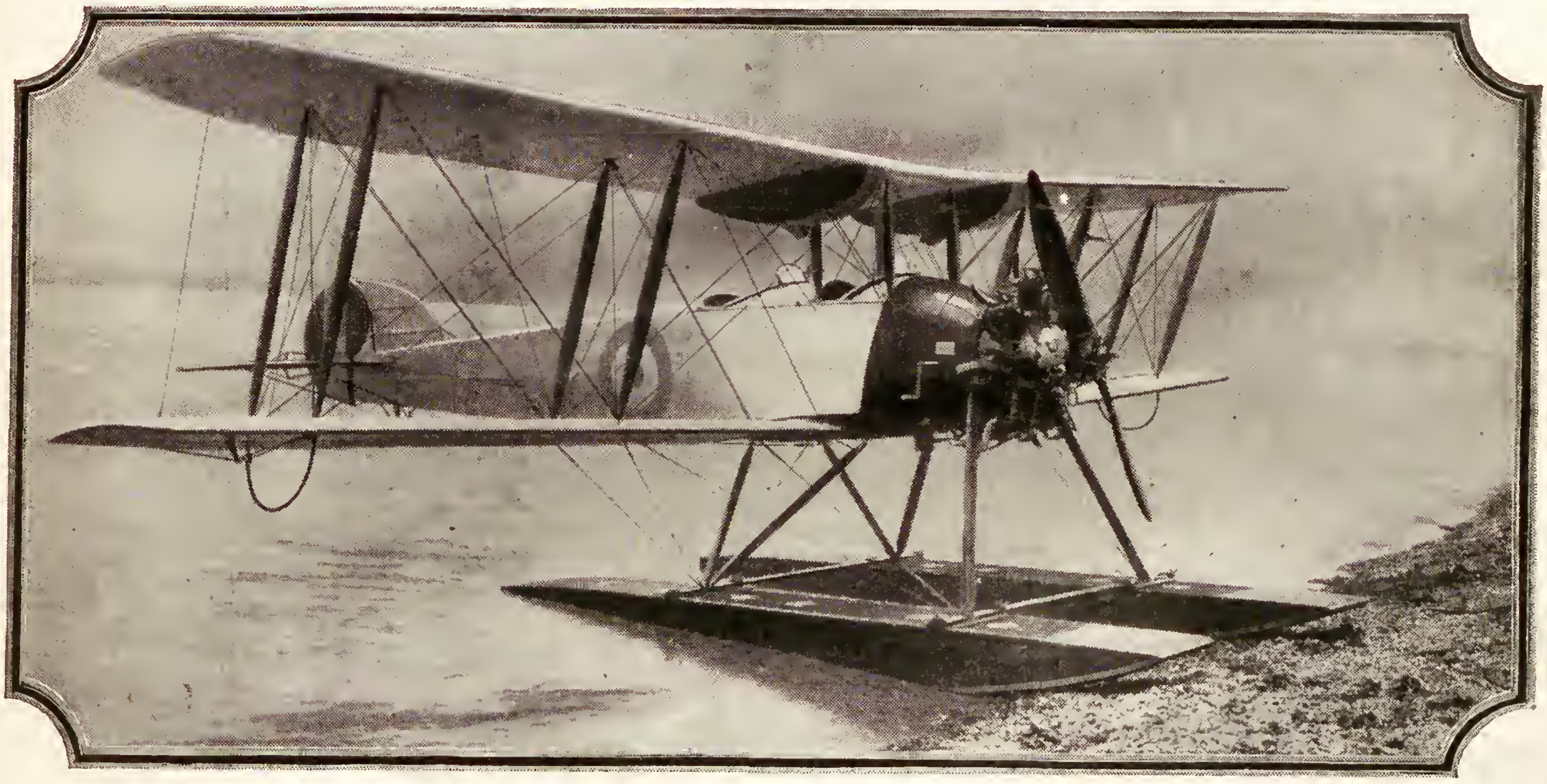

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Edited by C. M. POULSEN

October 28, 1926

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OUR CONTRIBUTORS

Mr. J. D. North, who was "missing" from the last issue of The Aircraft Engineer, returns to the attack this week upon problems connected with the stresses in aircraft in flight, more particularly in the wings. He calls attention to the somewhat unsatisfactory state of our present knowedge (or absence thereof) of the nature and magnitude of the various loads to which aeroplanes of different classes are subjected in flight, and points out the urgent need of experimental investigation, quoting passages from the 1922 report of the Load Factor Sub-Committee, and maintaining that the position in October, 1926, is practically the same as it was in January, 1922, since nothing appears to have been done towards obtaining the necessary experimental evidence.

Fig. 16 of Mr. North's article is interesting in showing that the maximum load factor on the wing spars occurs when the centre of pressure is at approximately one-third of the chord from the leading edge, a condition which is generally chosen in experimental testing abroad.

Mr. North then proceeds to examine the problem for what it is worth under conditions imposed at the present time, and point sout that the general expression for structure weight percentage does not cover the case of the wings, since some part of the forces on these is relieved by gravitational and inertia forces. He considers the case where the weight of the wings is made up of parts following the structure law and parts whose weight varies as $W^{\frac{3}{2}}$. The curves given for the two cases are interesting and should be closely studied.

Dr. Leslie Aitchison brings his very interesting and instructive series of articles on Duralumin to a close this week, and we feel certain our readers will join us in expressing to Dr. Aitchison our thanks for his valuable contribution to the general knowledge of the characteristics, peculiarities and treatment of this material which, in the view of many, is destined to become increasingly popular as a material for all-metal aircraft construction. We are aware that there are still those who are "afraid" of Duralumin, but such firms as have had most experience of it, among them being Short Brothers, have nearly always found their fears ill-founded, and we believe that Dr. Aitchison's articles will have done much towards a better understanding of the characteristics of this material.

AIRCRAFT PERFORMANCE.

Structural Policy in Design.

By J. D. North, F.R.Ae.S.

(*Continued from p. 77.*)

The experimental evidence quoted in the last article may appear alarming in the light of English practice in regard to load factor; but, it must be remembered, the true strength figure (corresponding to the French "*Indice d'essai*") is higher than the specified factor or at least normally so, the amount being usually 15 per cent. under extreme centre of pressure conditions or as much as 30 per cent. with the centre of pressure in its most favourable position.

In the first case with the normal type of biplane structure, relief is obtained by redundancy through the incidence bracing. An approximation to the influence of the redundant members may be obtained by strain energy methods up to, roundly, half the failing load. Before actual failure takes place plastic extension of members, notably bracing wires, modifies the relative rigidity of the members composing the structure, causing relief to the overstrained members. We have here some protection from the possible detrimental influence of unconsidered redundancies and bad rigging. Where, however, stresses from these causes contribute to fatigue conditions, either actual alternating loads or by shifting the mean stress figure, failures will readily occur.

In the second case, it is evident that as the centre of pressure moves backwards, the load on the front spar decreases, and as it moves forward the load on the rear spar decreases. This is illustrated in Fig. 16. It will be observed that the maximum factor occurs with the centre of pressure roughly one-third of the chord from the leading edge, a condition frequently chosen in experimental testing, except under the English system.

Figures for experimental strength must therefore be carefully examined to ensure that they are on a common basis. This influence of centre of pressure on load factor does not affect the rest of the aeroplane in the same way as it does the wings. At the time when the wings have their maximum load factor the tail load is considerably less than in high speed conditions, *e.g.*, c.p. back and terminal nose dive; further, the scantlings of the rear portion of the fuselage are often determined by the tail skid load. The strength of the front part of the aeroplane is generally influenced by the under-carriage loads and engine installation over normal strength for flight conditions.

The nature and magnitude of the various loads to which aeroplanes of different classes are subjected in flight is in

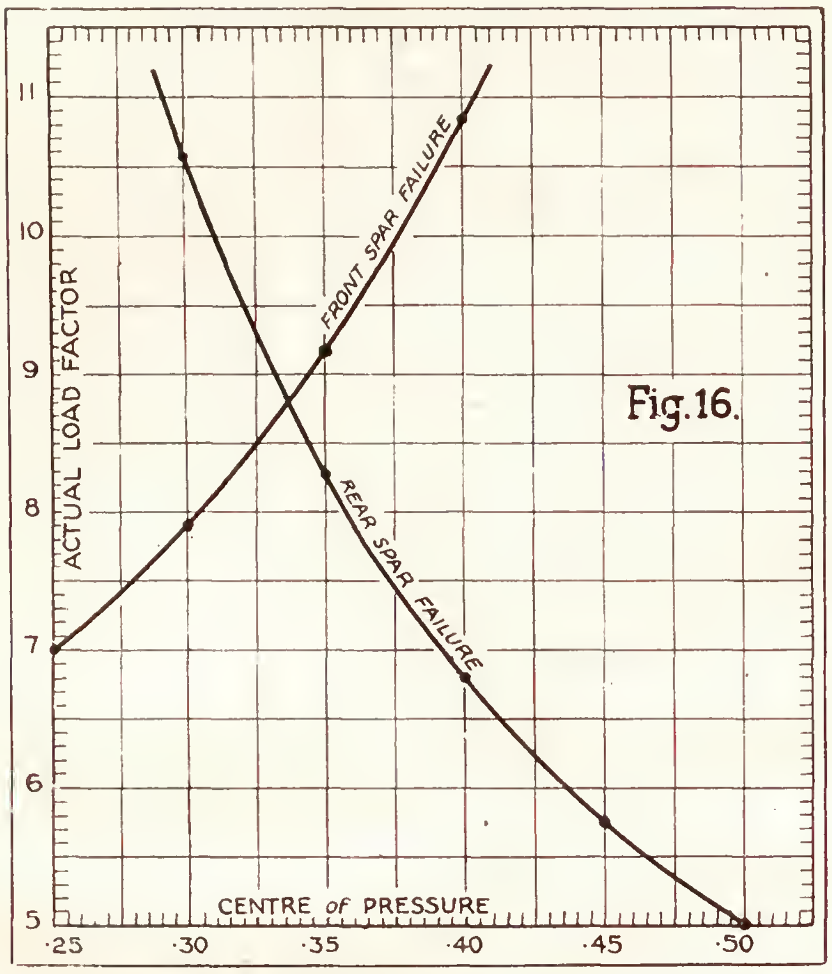

Fig. 16.—Effect of Centre of Pressure Travel on Load Factor of Wings.

Front and rear spars are assumed to be placed at 0·12 and 0·67 of the chord, measured from the leading edge. With the c.p. forward at 0·25 chord, the front spar has a factor of 7, and with the c.p. back at 0·50 chord the rear spar has a factor of 5.

As the c.p. moves back, the proportion of load carried by the two spars changes, as indicated below, the load factors following the changes. The maximum factor is 8·82, which is reached when the c.p. is at 0·336 chord.

C.P.	Load on—		Load Factor.	
Position.	Front Spar.	Rear Spar.	Front Spar.	Rear Spar.
0·25	0·764	0·236	7·00	14·62
0·30	0·673	0·327	7·93	10·57
0·35	0·583	0·417	9·16	8·28
0·40	0·492	0·508	10·86	6·80
0·45	0·401	0·599	13·32	5·76
0·50	0·309	0·691	17·28	5·00
0·336	0·607	0·393	8·82	8·82

urgent need of experimental investigation. In January, 1922, the position was summed up by the Load Factor Sub-Committee as follows :—

"In the past it has been the custom to calculate the stresses in an aeroplane under certain assumptions, in regard to the aerodynamic loading, which admittedly did not cover extreme conditions. The validity of the methods employed in calculation could be checked against the results of static tests made on a portion, or on the whole, of the structure, but no evidence for the accuracy of the assumptions could be adduced, beyond the general experience that machines stressed in this way, and designed with the factors of safety then customary, had proved strong enough in flight. This position is clearly not very satisfactory, in that everything which contributes to the strength or weakness of an aeroplane is taken indiscriminately into consideration.

"For a logical system of stressing it is necessary to know (1) the aerodynamic loading on the various parts of the machine ; (2) the strength of these parts ; and (3) an appropriate value of the factor of safety."

The position in October, 1926, is practically the same as it was in January, 1922, since nothing appears to have been done towards obtaining the necessary experimental evidence. The position with regard to centre of pressure coefficient is happier in that a method of calculation is now available which is reasonably accurate for all practical purposes. Past experimental evidence conflicting with calculations requires re-investigation, when much will be found, no doubt, to be of low evidential value.

The proposed scheme of factors of reliability and safety are too valuable to be neglected. The absolute values suggested need not be taken too seriously; for example, the factor of safety chosen was probably largely due to the fact that two was the smallest whole number larger than one. No such scheme ought to result in heavier aeroplanes, rather in lighter structure for the same reliability, probability of failure. Pending this work, investigations as to influences of change of geometry and scale on structure weight are vested with an underlying unreality which is disconcerting to those desiring to make real progress.

We can, however, only examine the problem for what it is worth under conditions imposed today. In a previous article it was pointed out that the general expression for structure weight percentage

$$\frac{W_s}{W} = \alpha W^{\frac{1}{2}} + \beta + \gamma W^{-\frac{1}{2}} + \delta W^{-1}$$

does not cover the case of the wings since some part of the forces on them are relieved by gravitational and inertia forces. We may consider the weight of the wings with a fair degree of accuracy to be made up of parts following the structure law ($W^{\frac{3}{2}}$) and parts whose weight varies as W. Using the symbol $(W_p)_s$ for the former and W_p for the weight of the planes, this is expressed as

$$W_p = (W_p)_s + K\,W.$$

$$\therefore \quad \frac{(W_p)_s}{W} = \frac{W_p}{W} - K.$$

K is a constant depending on the design of the wings. Now, since the forces on them are relieved by the weight of the wings.

$$\frac{(W_p)_s}{W} = C.\left(1 - \frac{W_p}{W}\right) W^{\frac{1}{2}},$$

where C is a constant. The load factor (F) can also be introduced.

$$\frac{(W_p)_s}{W} = C\,F\left(1 - \frac{W_p}{W}\right) W^{\frac{1}{2}}$$

$$\therefore \quad \frac{W_p}{W} - K = C\,F\,W^{\frac{1}{2}} - C\,F\,\frac{W_p}{W}\cdot W^{\frac{1}{2}}$$

$$\frac{W_p}{W} = \frac{C\,F\,W^{\frac{1}{2}} + K}{1 + C\,F\,W^{\frac{1}{2}}}$$

which can be written

$$\frac{W_p}{W} = \frac{C\,F\,W^{\frac{1}{2}}}{1 + C\,F\,W^{\frac{1}{2}}}\,(1 - K) + K.$$

In Fig. 17 this expression has been plotted for some selected values of $\frac{W_p}{W}$ and $\frac{(W_p)_s}{W}$, as follows :—

$$W = 8{,}600 \quad \frac{W_p}{W} = 0\cdot 160 \quad \frac{(W_p)_s}{W} = 0\cdot 128$$

$$F = 5\cdot 5$$

$$\text{from which } C = 0\cdot 000299$$

$$\text{and } K = 0\cdot 032$$

and in Fig. 18

$$W = 8{,}600 \quad \frac{W_p}{W} = \frac{(W_p)_s}{W} = 0\cdot 160$$

$$C = 0\cdot 000373 \qquad K = 0.$$

In the second case the whole wing is assumed to follow the structure law, while the other constants more nearly represent practical construction. The curves are important as to their form rather than for their actual numerical value. They

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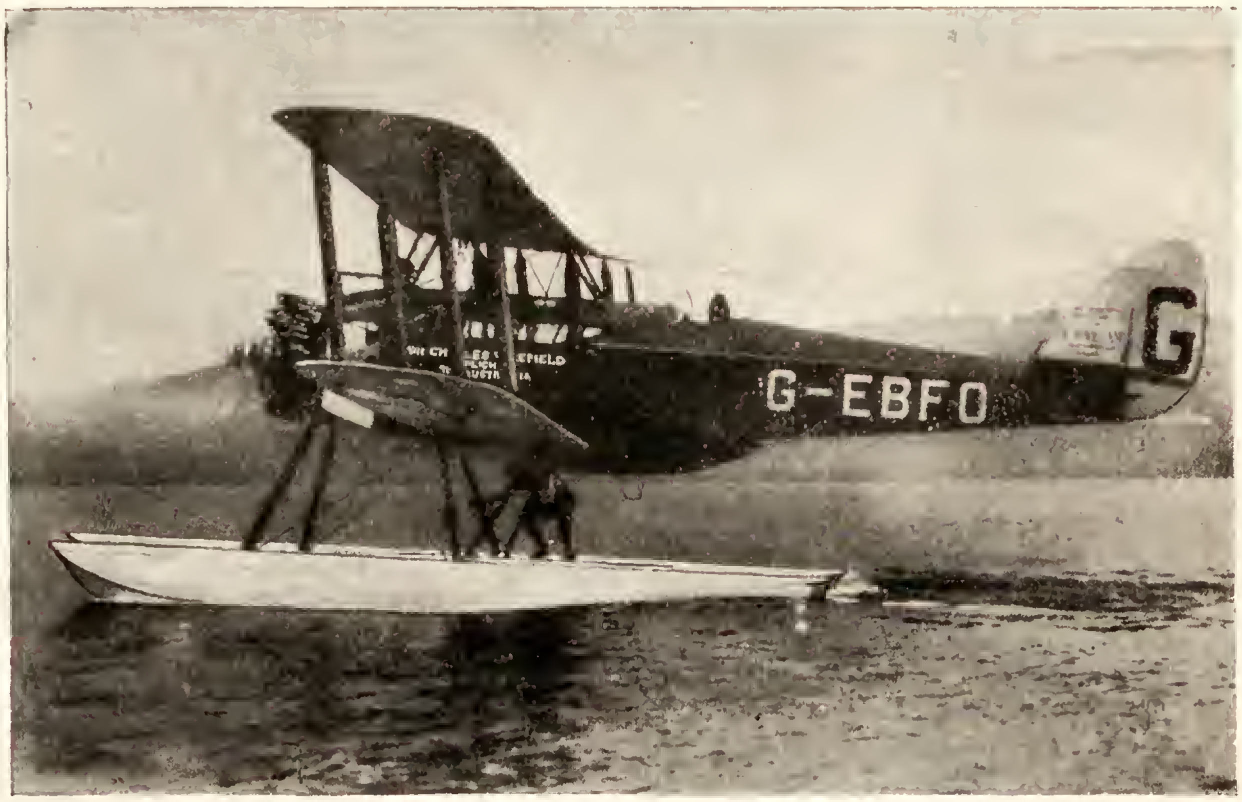

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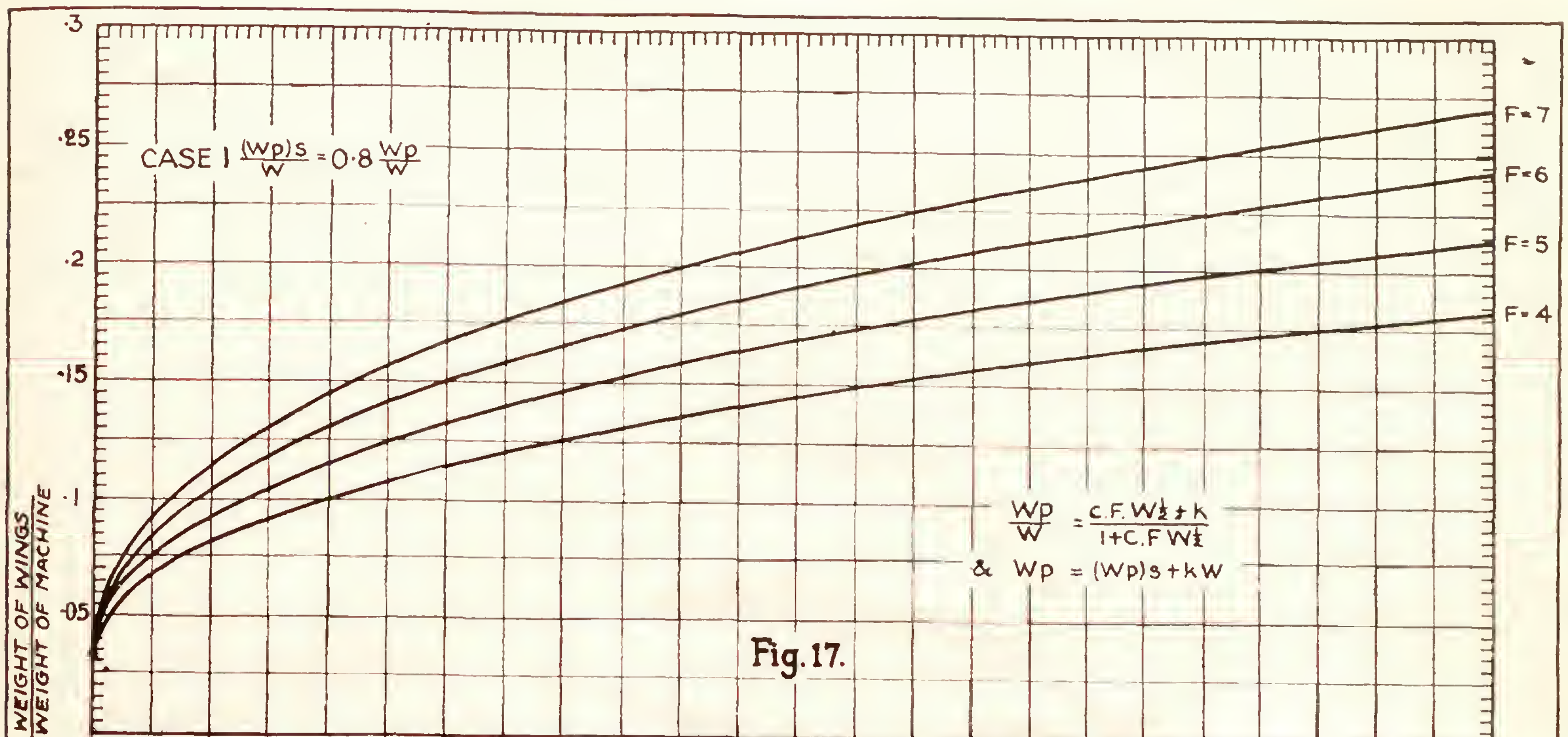

Fig. 17.

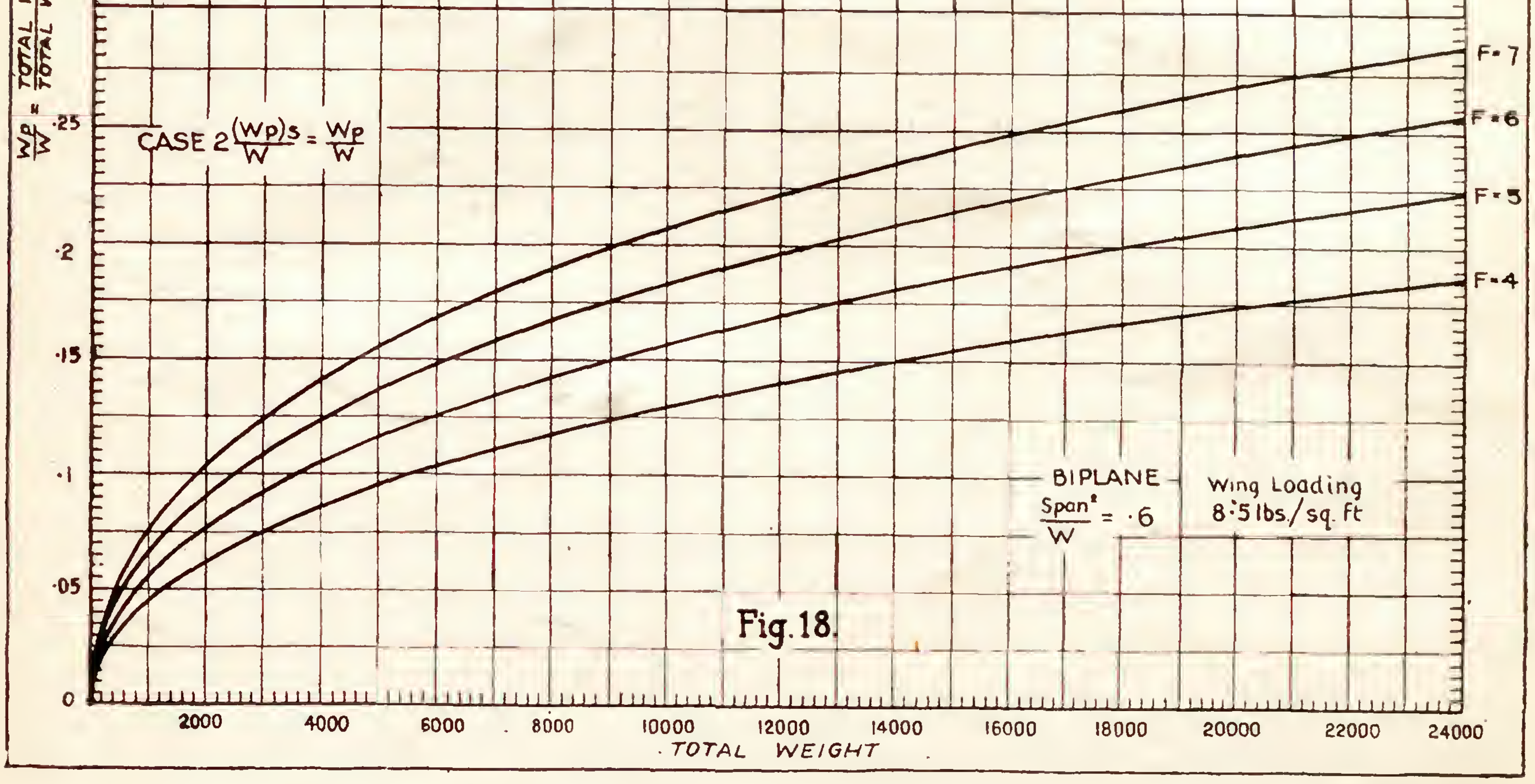

Fig. 18.

correspond approximately to a value for $\frac{\text{Span}^2}{\text{W}}$ of 0·6 and a loading of 8·5 lb. per square foot. The effect of varying the loading on similar wings can also be illustrated. For example, take a machine of gross weight 10,000 lb., load factor 5, $\frac{\text{Span}^2}{\text{W}} = 0{\cdot}6$, loading 8·5 lb. per square foot. Change to $\frac{\text{Span}^2}{\text{W}} = 0{\cdot}5$, loading 10·2 lb. per square foot. In the first case the weight of the wings is 15·8 per cent. of the gross weight. Multiply the gross weight by the ratio of the $\frac{\text{Span}^2}{\text{W}}$ figures, *i.e.*, $10{,}000 \times \frac{5}{6}$ lb.

That is, 8,333.

Multiply the load factor by the inverse ratio,

i.e., $5 \times \frac{6}{5} = 6$.

The value of $\frac{W_p}{W}$ for 8,300 with load factor 6 is 0·168; multiply this by the ratio $\frac{5}{6}$ to express it as a fraction of the actual weight,

$$0{\cdot}168 \times \frac{5}{8} = 0{\cdot}14;$$

hence structure weight of the new wings is 14 per cent. against 15·8 per cent. for the original wings.

If the loading were to be kept constant so that there is a change of aspect ratio, the difference will be reduced. In the example considered the span was changed from, roughly, 77·5 to 71 ft., and the chord reduced from, roughly, 7·6 to just under 7 ft., whereas for constant loading the chord should be increased from 7·6 to 8·3 ft. The gap span ratio is assumed to remain constant (*e.g.*, about 0·11). As readers will remember from previous articles, this is the criterion of induced drag due to biplane effect.

The weight of wings may be considered as due to a structure of two parts: (*a*) the "span" structure, (*b*) the chord structure. The chord structure represents a much smaller proportion of wing weight and is less influenced by load factor and scale. The primary chord structure is merely represented by the drag struts and bracing, and the influence of changes in chord on spar loads, due to drag or drag components, as the latter is of opposite sign to the former, the influence of change of chord on the primary structure is small. The secondary chord structure is represented by the ribs and fabric—or rather, the effect on them of changes of chord. Mr. W. D. Douglas has suggested* the form $W \times c/w$ = constant [where W = the weight supported in lb. w = the weight of the rib, c = the chord, and the constant varies between 6.300 and 3,500, according to design.

$$i.e.,\ w = \frac{W.c}{\text{constant}}$$ and follows the structure law;

hence, if the weight supported by the rib remains a constant, the weight of the rib varies directly as the chord. To allow for the increase in chord to maintain constant loading, the weight of the rib must be increased in the ratio $\frac{8 \cdot 3}{7 \cdot 1}$, as must also the fabric and dope weight, which is nearly proportional to area. Appropriate figures, for example, would be 2·15 and 1·75 per cent. respectively—a total of 3·9 per cent. Deduct this from the 14 per cent. and add $\frac{8 \cdot 7}{7 \cdot 1} \times 3 \cdot 9$ per cent. = 4·55 per cent., giving a new figure of 14·65 per cent. for the structure of the wings with changed aspect ratio.

(*To be continued.*)

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* International Air Congress, London, 1923. Report, page 210.

DURALUMIN

By Leslie Aitchison, D.Met., B.Sc., F.I.C., M.I.A.E.

(*Continued from p.* 81)

From what has been written previously, it is obvious that Duralumin is available to industry in a very considerable variety of forms. The metal is, in fact, produced in almost all the metallurgical forms except that of a casting. One or two points of special interest respecting the behaviour of the material in its different forms may be considered to be worth particular mention.

A good deal has been said about forgings and drop forgings in Duralumin, and the method of manufacture of such parts. In the machining of such parts no difficulties will arise if the material is treated, more or less, as though it was brass. The same speeds and feeds and tool angles as are used with brass will be found to give satisfactory results. The most satisfactory lubricant to employ is a mixture of paraffin and lard oil. It is desirable that alkaline solutions should not be employed as lubricants in the machining of Duralumin, and the medium suggested above will be found to be the most generally suitable one.

The same remarks as to machining apply to extruded and hammered Duralumin bars. Wherever possible, it is desirable to avoid the production of parts by machining them from particularly large sizes of bar. If a drop forging can be made, or even a rough forging, it will in general be found to be decidedly preferable to the machine-produced part. If they must be produced it is desirable that parts machined out from large bars should be heat-treated after rough machining, as otherwise there is bound to be an undesirable variation in the mechanical properties of the finished article.

The other class of extruded material, namely, sections of special shapes, is of conspicuous interest. Extruded Duralumin is pressed into shape and thereafter is heat-treated in the usual way to produce the requisite mechanical properties in the finished article. The extrusion process, of course, is carried out with hot metal, and the material is, therefore, shaped whilst it is in a very plastic condition. It is agreed that even during the extrusion process there will be a certain residuum of uneven strain set up in the material that remains after pressing, but this amount is quite small when compared with that produced by cold working. In any case, the residual strains are removed by the heat-treatment process. This means that in an extruded section the mechanical properties of the Duralumin are very uniform (excluding those very large sections in which there is a possibility of the mass effect in hardening becoming operative). This means that a section in which there are perfectly definite sharp corners is actually produced without any more strain remaining in the metal at the sharp corners than at positions markedly removed therefrom. This is a matter of some importance in design.

The corresponding type of section, namely, that known as "rolled and drawn," is of course, produced in a somewhat different way. In this case there is a severe cold deformation of the Duralumin, and consequently sharp corners are rather more to be avoided. Rolled and drawn sections may, of course, be produced from material that has just been quenched, *i.e.*, during the "soft period" in the normalising operation. If this method is chosen the material is not subsequently heat-treated, and some of the cold strains due to the shaping of the section are necessarily left in the finished metal. On the other hand, rolled and drawn sections can be produced from annealed metal and heat-treated after shaping. If this process is adopted, then the strains due to the cold working are evened up by the heat-treatment, and the resulting section is more or less as uniform in its mechanical properties as the extruded sections already described. There has, of course, been a severe straining of the metal during the cold-drawing operations, and the use of very sharp corners is always a possible source of danger at this stage.

The question is often asked as to how far it is reasonable to attempt to shape Duralumin in the cold after it has been heat-treated. Obviously, the same question arises in connection with the heat-treated high-tensile steels, or with mild steels, or even with brass, and in all cases the practical answer is much the same—namely, that the material can be distorted quite safely as much as it will stand without fracture. There is no more harm in working normalised Duralumin in this way than there is in working steel or brass, and the same rules will apply to all the metals. Obviously, however, if any of these materials are cold-worked they are bound to be strained by the cold work, and therefore, to be stronger or weaker to this extent than if they had not been cold-worked. There is nothing unusual about Duralumin in this regard. In practical engineering it is quite necessary for this type of work to be done, and when it has to be performed it will generally be found quite a safe guide to take that the material will withstand bending quite satisfactorily over a radius which is not smaller than three times the thickness of the metal. This refers to the material in the fully aged condition. If the metal is worked whilst in the "soft" condition immediately after quenching, a smaller radius can be negotiated.

Duralumin tubes are usually found to have a higher tensile strength than any of the other usual forms of Duralumin. As the maximum stress of the material in the tube form is higher, its ductility in tubes is less than in sheet or bar. The working of Duralumin tubes is a matter which is not very lightly to be undertaken. Most forms of shaped tubes can be obtained direct from the makers of the metal, and such operations as bending, flattening, and twisting are successfully performed by the manufacturers of the material.

Duralumin tubes can be flattened and can be expanded without serious difficulty, but the extent of these operations is necessarily limited by the ductility of the material, which, as stated above, is usually somewhat lower in tubes than in the other forms in which Duralumin is employed. The operation of flattening or expanding a tube is, of course, one in which the metal is stressed transversely, and the operations call for the material to distort the "worst" way of the grain, which is the direction in which the material is least capable of extension. In the ordinary way a Duralumin tube can be expanded without failure by an amount approximately equal to 20 per cent. of the diameter of the tube.

Although rolled and drawn sections and extruded sections can be produced in a state of uniform freedom from strains, despite the presence of sharp corners, this fact must not be allowed to cloud the issue with respect to the way in which these sections can subsequently be handled. If, for instance, an angle section is produced with a sharp corner either by the extrusion process or by rolling and drawing, it is in a perfectly satisfactory condition to use as it stands. If, however, attempts are made to flatten out the angle, the presence of the sharp corner will necessarily make itself felt and will cause difficulty in the flattening operation. The probable result will be that the angle will crack through the sharp corner. If, therefore, any such operations are likely to be carried out on the material after it has been hardened

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(*i.e.*, normalised), the section should be produced with an adequate radius in the corner, and should not be obtained "sharp."

In the construction of articles from Duralumin it is customary to rely upon riveted joints. It would, of course, be a particularly convenient thing under many circumstances if welded or soldered joints could be made in the metal and relied upon. The application of either of these two processes to Duralumin presents certain difficulties. The soldering of Duralumin suffers from all the disadvantages that are generally encountered in carrying out this operation on aluminium or light alloys. It can probably be said quite accurately that the difficulties of soldering Duralumin are scarcely different from those met with in the soldering of aluminium. It is known that aluminium can be soldered with more or less success, but that the soldered joint can only be used with satisfaction under certain definitely defined conditions. It is no good to expect the joint to be strong, and soldered joints in Duralumin should, therefore, be reinforced by riveting. Furthermore, those solders which are applied to the naked Duralumin are very frequently such as lead to ready and rapid corrosion.

The welding of Duralumin follows somewhat on the same lines, but there are certain features that are not met with in the welding of plain aluminium. Naturally, Duralumin that has to be welded must necessarily be heated to a high temperature, sufficiently high to reduce the mechanical properties of the normalised Duralumin approximately to those of annealed Duralumin. This refers to the condition of the material at and in the vicinity of the weld. In the second place, a welded joint in Duralumin has the same characteristic as a weld in any other material—namely, that it is the result of what is more or less a casting operation. This necessarily means that the material at the weld has approximately the ductility of a cast metal. (The same remarks apply to welded steel structures. The material that is used for filling in is applied in the molten condition and, therefore, is to all intents and purposes cast into position. A welded-steel joint, therefore, is similar in properties to a steel casting, and after normalising the joint is similar in properties and structure to those of a normalised steel casting.) It will be safe to infer, therefore, that welded Duralumin joints are only likely to become really useful when joints of sufficient excellence can be produced that the whole article can subsequently be submitted to the heat-treatment operation. This naturally limits very considerably the useful application of welding to Duralumin structures.

In conclusion, it may not be out of place to make some remarks as to the sources of supplies of Duralumin. Naturally, the aircraft industry in particular is concerned to know whether Duralumin is likely to be available in adequate quantities in the event of a war, and more particularly in the event of a war of the magnitude of the last one. The only serious question which arises in this connection is whether there would be adequate supplies of the necessary raw materials for the production of Duralumin in the quantities that would be required. This narrows itself down to a consideration of the supply of aluminium, copper, manganese and magnesium.

There is no need to enter into the question of the supply of copper and manganese, and the inquiry can, therefore, be narrowed down to magnesium and aluminium. Both of these materials are produced in this country in quantities. The quantity of magnesium required for the manufacture of Duralumin is not very large compared with that which would be consumed in other directions in warfare, and the existing capacity for its production in this country is quite equal to any demand that is likely to be made upon it by the aircraft industry and the others who would use Duralumin in wartime.

Aluminium is being used every day in greatly increased quantities in various directions, and the British makers of aluminium are having to cope with a demand that is steadily growing. In the event of a war, of course, the output of these suppliers would naturally be concentrated upon satisfying the needs of the fighting services. At the present time the British suppliers are able to manufacture quite as much aluminium as would be likely to be required by the aircraft industry in a war of the same scale as the last, but they are, as is well known, increasing their capacity for production very considerably, and it is quite clear that the available supplies of aluminium will be more than equal to the aeronautical requirements of the country in the event of war, even taking into account the considerable quantity that would be employed in other branches of warfare. This is not the place in which to give the data that would prove this statement, but the facts, nevertheless, remain as stated. The only question that remains, therefore, is that of the availability of sufficient raw material from which aluminium manufacturers can produce the metal. In other words, the supply of ore must be quite adequate.

As is well known, aluminium is produced from a mineral called bauxite. Various grades of this material exist, and in different qualities it is distributed very widely over the surface of the globe. Large quantities of bauxite, possibly the predominant proportion of the usefully workable supplies, are located in the British Empire, and are, therefore, available to this country in the event of a war, which might possibly remove the European supplies of the material from the British manufacturers. It is agreed that all these sources of supply are not equal in quality, but there is certainly quite enough in the British Empire of the best quality to produce the requisite aluminium.

Fortunately, perhaps, bauxite has to undergo very special processes of purification before it can be reduced to aluminium, and as a result the aluminium manufacturers are bound to maintain a very large quantity of the ore at, or in the vicinity of, their reduction furnaces. This would mean that in the event of a sudden outbreak of war, resulting in a temporary dislocation of the merchant marine, the aluminium-producing companies would not be left short of the supplies of the necessary raw material. It appears to be quite safe to say that they would be able to continue for many, many months without hindrance in the production of aluminium to their full capacity, even though not an ounce of bauxite reached these shores from the deposits overseas.

It becomes plain, therefore, that in all the links of the chain the circumstances are such as would ensure a continuous supply of aluminium for the production of Duralumin. The other constituents of the alloy are available from home supplies, and, therefore, it is evident that in the event of a war, even of great magnitude, supplies of Duralumin would be quite adequate for the needs of the Air Ministry, even though this was based upon an "all-Duralumin" programme.

TECHNICAL LITERATURE.

A.R.C. REPORTS.

AN INVESTIGATION OF THE FLOW OF AIR AROUND AN AEROFOIL OF INFINITE SPAN.*

By L. W. Bryant, B.Sc., A.R.C.Sc., and D. H. Williams, B.Sc., with an Appendix by G. I. Taylor, F.R.S.

R. and M. No. 989 (Ae. 200). (44 pages, 20 figures.) February, 1924. Price 1*s*. 9*d*. net.

A great deal of attention has been directed of late years to the development of a rational theory of the aerofoil. Prof. L. Prandtl and others in Germany have applied the principles of the hydrodynamics of a perfect fluid to the aerofoil with remarkable results, whilst investigators in this country have extended this work and have verified experimentally many of the deductions of the Prandtl theory. The assumptions underlying the work of Prandtl are, however, of uncertain validity, and it has become a matter of great importance to add to existing experimental evidence of the fundamental characteristics of the motion of a viscous fluid round an aerofoil. With this purpose in view an aerofoil section of fairly high lift coefficient was selected, and a model of it tested in the duplex tunnel at the National Physical Laboratory, the field of flow being thoroughly explored with a wind-velocity meter. At the same time the theoretical stream-lines corresponding to inviscid fluid flow were determined experimentally, as described in Part II of this paper.

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* Royal Society, A., Vol. 225, November, 1925.

The case considered is that of an aerofoil of infinite span, the flow being two-dimensional. A comparison was made of the theoretical and experimental distributions of pressure over the surface of the aerofoil, as well as of the two sets of superposed stream-lines.

The work has provided an experimental verification of the law of Kutta and Joukowsky, that the product of the mean velocity and density of the fluid and of the circulation (according to the hydrodynamical definition of this term) around a contour enclosing the aerofoil is equal to the lift of the aerofoil (per unit length). It has further shown that the circulation around the aerofoil is constant within the limits of experimental error and independent of the contour of integration chosen, provided that the contour line does not at any part approach too near to the aerofoil, and also that it cuts the trailing "wake" approximately at right angles to its core. The lowest value of the circulation found (calculated for a contour as close to the aerofoil surface as the observations permitted) was about 6½ per cent. less than the value corresponding to the lift coefficient; this is hardly outside the limits of experimental accuracy in the neighbourhood of the aerofoil.

The theoretical streamlines were calculated on the assumption that a circulation existed corresponding in magnitude to that observed experimentally. Under these conditions there is no evidence that the experimental front stagnation point differs in position sensibly from the theoretical one. The rear stagnation point is indeterminate, and, in fact, meaningless, in the experimental field; and, indeed, the extremely unsteady and turbulent character of the flow over the rear part of the upper surface and onwards points to a near approach to the "stalling" or "burbling" condition.

THE BEHAVIOUR OF SINGLE CRYSTALS OF ALUMINIUM UNDER STATIC AND REPEATED STRESSES.* PARTS I, 2 AND 3.

By H. J. GOUGH, M.B.E., B.Sc., D. HANSON, D.Sc., and S. J. WRIGHT, B.A.

Work Performed for the Engineering Research Board of the Department of Scientific and Industrial Research.

R. & M. No. 995 (M. 32). (54 pages, 24 photographs, 26 figures.) November, 1924. Price 3*s.* 6*d.* net.

Metals as ordinarily used in practice are in the form of "crystalline aggregates" made up of large numbers of small crystals separated by boundaries. It is sometimes thought that these boundaries consist of "non-crystalline" or "amorphous" material. In view of the fact that little or nothing is known of the influence of these boundaries on the observed fatigue phenomena it was considered that the general problem of failure of metals should first be attacked by an investigation into the behaviour of the crystals themselves. An investigation of this nature was therefore undertaken at the National Physical Laboratory, the test specimens employed being cut from "Single Crystal" bars of aluminium. The present report deals with the results so far obtained, together with a discussion of certain conclusions drawn from them. It should be mentioned that work on Non-Crystalline materials is being carried out elsewhere by Professor Jenkin and by Dr. A. A. Griffith.

The report deals with the changes in micro-structure, and the deformation and fracture of single crystals of aluminium subjected to:—

(1) Rapid reversals of direct stresses;
(2) Reversals of torsional stresses;
(3) Slow cyclic repetitions of tensile; and
(4) Single blow impact-tensile tests.

Mechanical, microscopical and X-ray methods have been employed and the results of all these methods of investigation have been correlated.

The crystals possessed no primitive limit; the hysteresis effects observed in the tensile tests were in all respects similar to those obtained in tests on crystalline aggregates.

Under all ranges of stress, slip-bands were observed and were identified as the traces of actual slip-planes on the surface of the specimen. These slip-planes were found to be in very close agreement with the octahedral planes of the crystals. The slip-bands resulting from the application of low ranges of stress were much straighter and more regular than those occurring under higher ranges.

Deformation proceeded by slipping on these planes, the particular octahedral planes playing the major part in the distortion being that set which was most nearly parallel to a plane of maximum shear stress. Further the direction of slip on these planes coincided with that of the most highly stressed principal lines of atoms.

Very marked hardening effects were produced by slip. A consideration of these and other effects led to the conclusion that slipping caused a distortion or "rumpling" of the slip-planes. On this conclusion a theory of slip and of the rupture of crystalline materials has been based and is presented in Part III of the report.

It is considered desirable to make some further tests of the same nature as those described in this report—particularly some further tests under reversed torsional stresses. In addition it is hoped:—

(1) To obtain direct experimental evidence of slipping in the reversed direction on planes parallel to the original slip-planes, during the unloading part of direct stress cycles in which the mean stress is tensile.

(2) To obtain information as to the influence of the crystal boundaries by tests on specimens consisting of two or three distinct crystals.

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* Previously published in Royal Society Phil. Trans., A, Vol. 226, pp. 1-30, 1926.

FULL-SCALE AND MODEL MEASUREMENTS OF LIFT AND DRAG OF BRISTOL FIGHTER WITH R.A.F. 32 WINGS.

By E. F. ANDERSON, B.Sc., and L. E. CAYGILL, B.Sc.
Presented by the Director of Scientific Research.

R. & M. No. 1006 (Ae. 212). (5 pages and 6 diagrams.) December, 1925. Price 6*d.* net.

This report continues the series of model and full-scale comparisons of the lift and drag of biplanes using thick section wings, the method of experiment being the same as that described in R. & M. 859.*

The lift and drag of a Bristol Fighter aeroplane with wings of R.A.F. 32 section have been determined both on the full-scale aeroplane and on a 1/10th scale model at speeds of 40. 60 and 90 ft./sec.

The maximum lift coefficient is higher for the full-scale aeroplane than for the model, but the increase is not so large as for R.A.F. 31. The drag coefficient is considerably lower on the full-scale than on the model, particularly at minimum drag.

A Bristol Fighter aeroplane with R.A.F. 30 wings will shortly be tested, and measurements will be made on a model for comparison. (*See also* R. & M. Nos. 928† and 946‡.)

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* R. & M. 859.—Lift and drag of the Bristol Fighter with wings of three aspect ratios.—Aerodynamics Staff, R.A.E.

† R. & M. 928.—Test of four thick aerofoils, R.A.F. 30, 31, 32 and 33.—Brafield and Hartshorn, R.A.E.

‡ R. & M. 946.—The theory of the design of aerofoils, with an analysis of the experimental results for the aerofoils R.A.F. 25, 26, 30 to 33.—Glauert, R.A.E.

FULL-SCALE AND MODEL MEASUREMENTS OF LIFT AND DRAG OF BRISTOL FIGHTER WITH HANDLEY PAGE SLOTTED WINGS.

By E. T. JONES, B.Eng., and L. E. CAYGILL, B.Sc., A.M.I.M.E.

R. & M. No. 1007.—(Ae. 213). (9 pages and 12 diagrams.) December, 1925. Price 9*d.* net.

This report extends the range of the comparison of full-scale and model measurements of lift and drag on complete aeroplanes to the case of the slotted wing, and the results have been compared with those on the standard aeroplane reported in R. & M. 897.§

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§ R. & M. 897.—The lift and drag of a standard Bristol Fighter aeroplane.—By the Staff of the R.A.E.

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A Bristol Fighter was fitted in succession with two sets of auxiliary leading aerofoils chosen as the result of tests carried out by Messrs. Handley Page in their wind tunnel on a model monoplane. The main wing section, to the rear of the front spar, was standard, and the front portion and leading aerofoils were shaped so that if the slot were closed a good high-speed section would be formed. No experiments were carried out with slot closed, the object of the test being to determine scale effect on lift and drag in the neighbourhood of the maximum lift.

In the case of the small leading aerofoil the full-scale and model maximum lift coefficients are in agreement at 0·74. With the large leading aerofoil, however, the full-scale reaches 0·85, as compared with 0·77 for the model. The model drag coefficient is about 0·007 higher than the full scale in both cases.

The experiments are being extended to compare the centre of pressure and downwash in the case of the large leading aerofoil. These data are required for the calculation of tail settings.

EXPERIMENTS ON THE FLOW BEHIND A ROTATING CYLINDER IN THE WATER CHANNEL.

By E. F. Relf, A.R.C.Sc., and T. Lavender.

R. & M. No. 1009.—(Ae. 215). (2 pages and 11 diagrams.) May, 1925. Price 9*d.* net.

The Flettner Rotor Ship has brought before the public one practical method of using the special properties of a rotating cylinder in a wind, these properties have been studied in various laboratories to find the aerodynamic efficiency of the cylinder. The present report describes a visual study in water and gives a number of photographs which show clearly the development of an increasing circulation as the rotational speed of the cylinder increases. Owing to the small scale of the available apparatus, no conclusions could be drawn as to the behaviour of the flow from the experiments at the higher rotational speeds.

ON THE DRAG OF AN AEROFOIL FOR TWO-DIMENSIONAL FLOW.

By A. Fage, A.R.C.Sc., and L. J. Jones.

R. & M. No. 1015.—(Ae. 218). (14 pages and 3 diagrams.) November, 1925. Price 7*d.* net.

According to modern aerofoil theory, the drag of an aerofoil of finite span is compounded of two parts, one a profile drag associated with the shape and attitude of the section, and the other an induced drag connected with the variation of lift along the span. The magnitude of this induced drag can be determined when the forces acting on the aerofoil are known. As the span increases, the profile drag per unit length approaches a limiting value, whereas the induced drag becomes relatively smaller, because of the more uniform distribution of lift, and would disappear completely if the span were infinite. The present paper deals exclusively with the profile drag of an aerofoil of infinite span, or, in other words, the drag for two-dimensional flow.

The experiments were made on an aerofoil of 0·5 ft. chord mounted in a 4-ft. wind tunnel, with small clearances between the tips and the tunnel walls (0·15 in.). Preliminary observations of total head showed that the wake was uniform along the span, except in the neighbourhood of the walls, where it opened out appreciably.

Observations of the normal components of the pressure around the median section of the aerofoil have been made, and it has been estimated that in the neighbourhood of minimum drag they account for about 80 per cent. of the total drag. For this particular aerofoil, therefore, the surface tractions contribute about 20 per cent. of the total drag.

Included in the paper is a comparison between the drag for two-dimensional flow predicted by the Prandtl theory from force measurements on an aerofoil of rectangular plan form, the ratio of span to chord being 6 : 1, and that estimated from the total-head losses in the wake; the agreement is close, except at large incidences, where the discrepancy is of the order of 10 per cent.

Finally, observations of pressure and velocity taken in the wake at some distance behind the aerofoil (0·68 chord), show that most of the total head losses can be accounted for by a decrease of velocity, and that the pressure does not differ appreciably from that measured in the surrounding stream.

REPORT ON DOPES AND DETONATION.

By Professor H. L. Callendar, C.B.E., F.R.S., Assisted by Captain R. O. King and Flying Officer C. J. Sims. Communicated by the Director of Scientific Research.

R. & M. No. 1013.—(E. 18). (54 pages, 15 figures.) November, 1925. Price 2*s.* net.

The investigations forming the basis of this report were undertaken at the Air Ministry Laboratory by request of Mr. H. E. Wimperis, then Acting Director of Scientific Research, who arranged for the experimental work to be directed by Professor Callendar and allocated suitable engine equipment to the Laboratory, following the submission by Professor Callendar of the nuclear theory of detonation.

The primary object of the investigation was the determination of the physical actions that delay or prevent detonation in an engine cylinder.

Such laboratory and engine experiments as were considered necessary to test the nuclear theory of detonation have been carried out, and, in addition, previous work bearing on the phenomena of detonation in engine cylinders has been reviewed.

The nuclear theory of detonation explains generally the action of dopes in delaying detonation, certainly to the extent that it may be taken as a guide in searching for anti-detonating substances free from the objectionable characteristics of the metallic dopes, and not subject to limitation of supply in time of emergency.

It is suggested that trials of metallic dopes should be made at higher engine compression pressures, and that the investigation of non-metallic dopes might be continued with the object of finding effective anti-detonating substances other than benzene derivatives. These trials will shortly be put in hand.

AN EXPERIMENT TO DETERMINE IF SLIP CAN BE DETECTED DURING THE UNLOADING PORTION OF A CYCLE OF REPEATED TENSILE STRESSES.

By H. J. Gough, M.B.E., B.Sc., S. J. Wright, B.A., and D. Hanson, D.Sc.

Work Performed for the Engineering Research Board of the Department of Scientific and Industrial Research.

R. & M. No. 1022.—(M. 38). (6 pages and 6 figures.) December, 1925. Price 6*d.* net.

The object of the present experiment was to determine whether any plastic deformation could be detected as the result of the unloading part of a cycle of repeated tensile loading.*

An apparatus was designed by means of which a test piece could be stressed in tension, and could be examined and repolished while under load. The load being then released, a further examination could be made. Any changes in microstructure due to the unloading could thus be isolated from those occurring in the remaining portion of a complete cycle.

No change in microstructure could be detected as a result of one unloading of a single crystal of aluminium from a stress of 1·78 tons/sq. in. On the other hand, no change could be detected when the specimen was *re-loaded* to the same stress, although a multitude of slip bands resulted from 100,000 further cycles. Consequently, the results of the experiment prove only that the amount of plastic strain which occurs in any one cycle after the first, at the range of stress used, is not sufficient to be detected under the microscope.

It is proposed to repeat the present experiment on further specimens using a much higher maximum stress. Similar work will also be performed on crystalline aggregates.

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* The more general investigation has been published under the title, "Behaviour of Single Crystals of Aluminium under Static and Repeated Stresses."—Gough, Hanson and Wright. Phil. Trans., Roy. Soc., Series A, Vol. 226, pp. 1–30, 1926, and R. & M. 995.

THE EFFECT OF METALLIC SOLS IN DELAYING DETONATION IN INTERNAL COMBUSTION ENGINES.

By Flight-Lieut. C. J. SIMS, D.F.C., D.I.C., R.A.F., assisted by Dr. E. W. J. MARDLES, F.I.C.

Presented by the Director of Scientific Research. R. & M. No. 1021 (E. 19). 11 pages. May, 1926. Price 6*d.* net.

The experimental work with metallic sols was undertaken as part of the Air Ministry Laboratory investigation of the cause of detonation in carburettor engines. A more general investigation has been published in R. & M. 1013 under the title of "Reports on Dopes and Detonation" by Professor Callendar.

The investigation of the action of metallic sols as small additions to engine fuel has included trials of as many such sols as it has been found possible to prepare.

It has been found that colloidal solutions of iron, lead and nickel in petrol are as effective in delaying detonation as the organo compounds of these metals. Metallic iron seems to be more effective than its carbonyl compound.

It is proposed to continue experimental work with metallic sols with a view to obtaining evidence as to the manner in which they act in delaying detonation.

THE ANALYSIS OF EXPERIMENTAL RESULTS IN THE WINDMILL BRAKE AND VORTEX RING STATES OF AN AIRSCREW.

By H. GLAUERT, M.A.

R. & M. No. 1026 (Ae. 222) (8 pages and 2 diagrams). February, 1926. Price 3*d.* net.

The vortex theory of airscrews, as developed in reports R. & M. 786* and 869,† determines the behaviour of an air screw under ordinary working conditions, but breaks down in the vortex-ring state and in part of the windmill-brake state. The theory may be represented in the form of a characteristic curve connecting two non-dimensional parameters F and *f*.

An attempt to extend the theory empirically and by means of certain general theoretical arguments has been made in report R. & M. 1014,‡ and this discussion has revealed the general nature of the characteristic curve in the region where the vortex theory breaks down. The experimental data have been analysed in the present report to determine the form of the characteristic curve in the regions where the vortex theory is inapplicable or inaccurate.

An empirical form of the characteristic curve has been determined which fits the experimental data and joins on to the theoretical curves in the propeller and windmill-brake states. The exact form of the curve will remain somewhat uncertain until the tunnel interference is known accurately or until further experiments are available from an open jet tunnel.

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* R. & M. 786.—An aerodynamic theory of the airscrew.—Glauert, R.A.E.

† R. & M. 869.—Notes on the vortex theory of airscrews.—Glauert, R.A.E.

‡ R. & M. 1014.—An extension of the vortex theory of airscrews with applications to airscrews of small pitch and including experimental results.—Lock, Bateman and Townend, N.P.L.

HYDROGEN AS AN AUXILIARY FUEL FOR A SOLID INJECTION OIL ENGINE.

By G. F. MUCKLOW, M.Sc. COMMUNICATED BY PROFESSOR A. H. GIBSON.

R. & M. No. 1029 (E. 20) (16 pages and 17 diagrams). April, 1926. Price 1*s.* net.

The report deals with experiments carried out in the Engineering Laboratories of the University of Manchester, on a Crossley solid-injection oil engine, in which small quantities of hydrogen and coal gas were introduced along with the air supply to the engine. The engine has a bore of 14 in., a stroke of 23 in., and a normal speed of 211 r.p.m. Its normal rating is 66 b.h.p.

References are made to the work of Dixon, Riedler, Wollers and Ehencke, Watson (Proc. Inst. Mech. Eng., May, 1912), and Fenning (R. & M. No. 979, May, 1924).

Three series of trials were run with hydrogen, each at a different load, viz., 53·4, 39·4 and 24·4 b.h.p. The maximum amount of hydrogen used was slightly more than 3 per cent. by volume of the air supply, corresponding, at the lightest load, to some 14 per cent. by weight of the oil fuel supply.

Three corresponding series of trials were run, using coal gas in place of hydrogen, the maximum volume of gas employed being 5 per cent. of the air supply. At the lightest load this corresponds to approximately 2·4 times the weight of fuel oil used.

Such quantities of hydrogen or coal gas can be used satisfactorily in the type of engine considered. No trouble was experienced due to pre-ignition or other causes, and the engine appeared to run more sweetly when gas was being used.

When running at constant load and speed, the admission of small quantities of gas appears to cause combustion to take place at a slower rate, giving a lower maximum pressure and more burning down the expansion stroke. The thermal efficiency is in consequence slightly reduced, while the heat losses to the exhaust are increased.

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THE ELEMENTS OF AEROFOIL AND AIRSCREW THEORY.

Very considerable strides have been made during the last few years in the development of a theory which would fit the observed phenomena connected with the action of a gas on a solid body such as an aerofoil, but it is rather strange that, although some of the earliest work on this subject was due to an Englishman, Mr. F. W. Lanchester, the development of the theory has been largely left to other nations, Germany in particular having contributed a great deal. Not only so, but it is to be feared that the work that has been going on abroad has not received at home the close and general attention which it deserved. Doubtless this is due in the main to the language difficulty. An excellent book on the subject of aerofoil theory was published in German some years ago,* but an English text-book on modern aerofoil theory has hitherto been lacking. It is therefore vastly more true of the new book by Mr. H. Glauert than is usually the case when the hackneyed phrase is used that it "fills a long-felt want." "The Elements of Aerofoil and Airscrew Theory," by H. Glauert, published by the Cambridge University Press at 14*s.* net, literally does "fill a long-felt want," and fills it in a manner wholly commendable. A very obstruse and learned exposition would have appealed to but a very few, but by writing it so as "to give an account of aerofoil and airscrew theory in a form suitable for students of aeronautical engineering who do not possess a previous knowledge of hydrodynamics," the author has rendered his book accessible to a vastly wider circle of readers.

Not that it should be assumed that Glauert's book is "easy reading." It is not, and the author does not profess to tell one all about aerofoil theory in "non-technical language." Had he claimed to do so, one would have looked upon the book with mistrust. As it is, complex mathematical analysis has been avoided as far as possible, and the book contains only the very minimum of "mathematics" necessary to the statement and explanation of the theory. The first five chapters give a brief introduction to those aspects of hydrodynamics which are required for the development of the theory. The following chapters deal with the lift of an aerofoil in two-dimensional motion, with the effect of viscosity and its bearing on aerofoil theory, and with the theory of aerofoils of finite span. The last three chapters deal with airscrew theory.

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* "Aerodynamik," by Richard Fuchs and Ludwig Hopf. Published by Richard Carl Schmidt & Co., Berlin, 1922.

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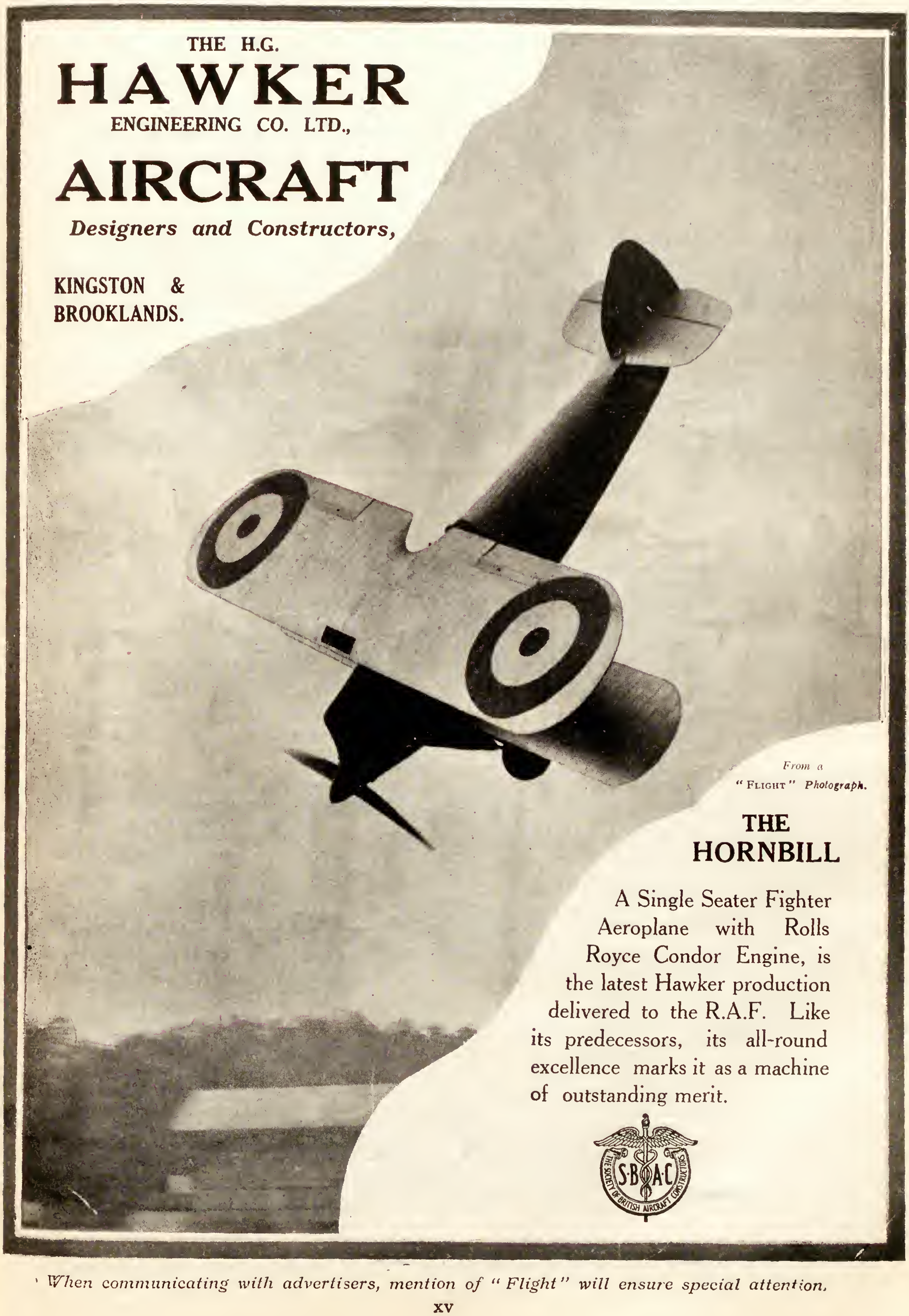

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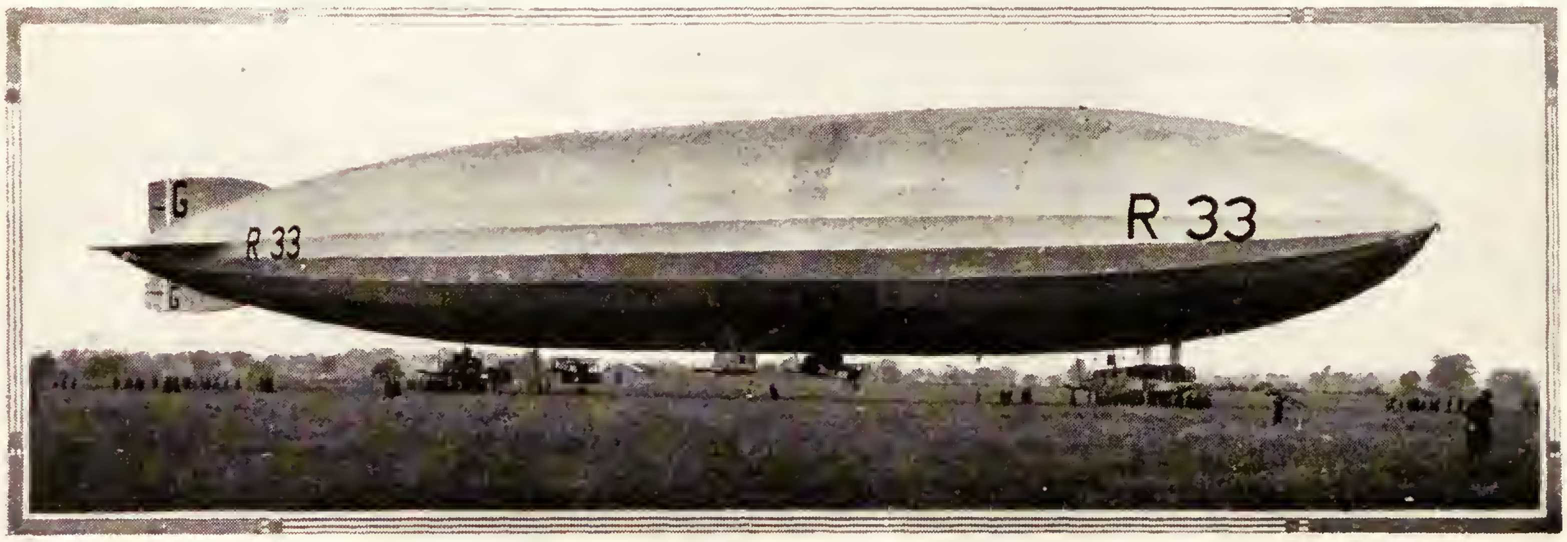
R.33 AS AIRCRAFT CARRIER

On October 21 last the British rigid airship R.33 carried out some further tests in connection with the airship development programme. The main feature of these tests, which were made at Pulham airship station, consisted in some further experiments in launching aeroplanes from the airship during flight. Previous experiments in this direction, it will be remembered, were carried out with a single D.H.53 light monoplane, which, piloted by Sq.-Ldr. Rollo Haig, was successfully launched from, and re-attached to, the R.33.



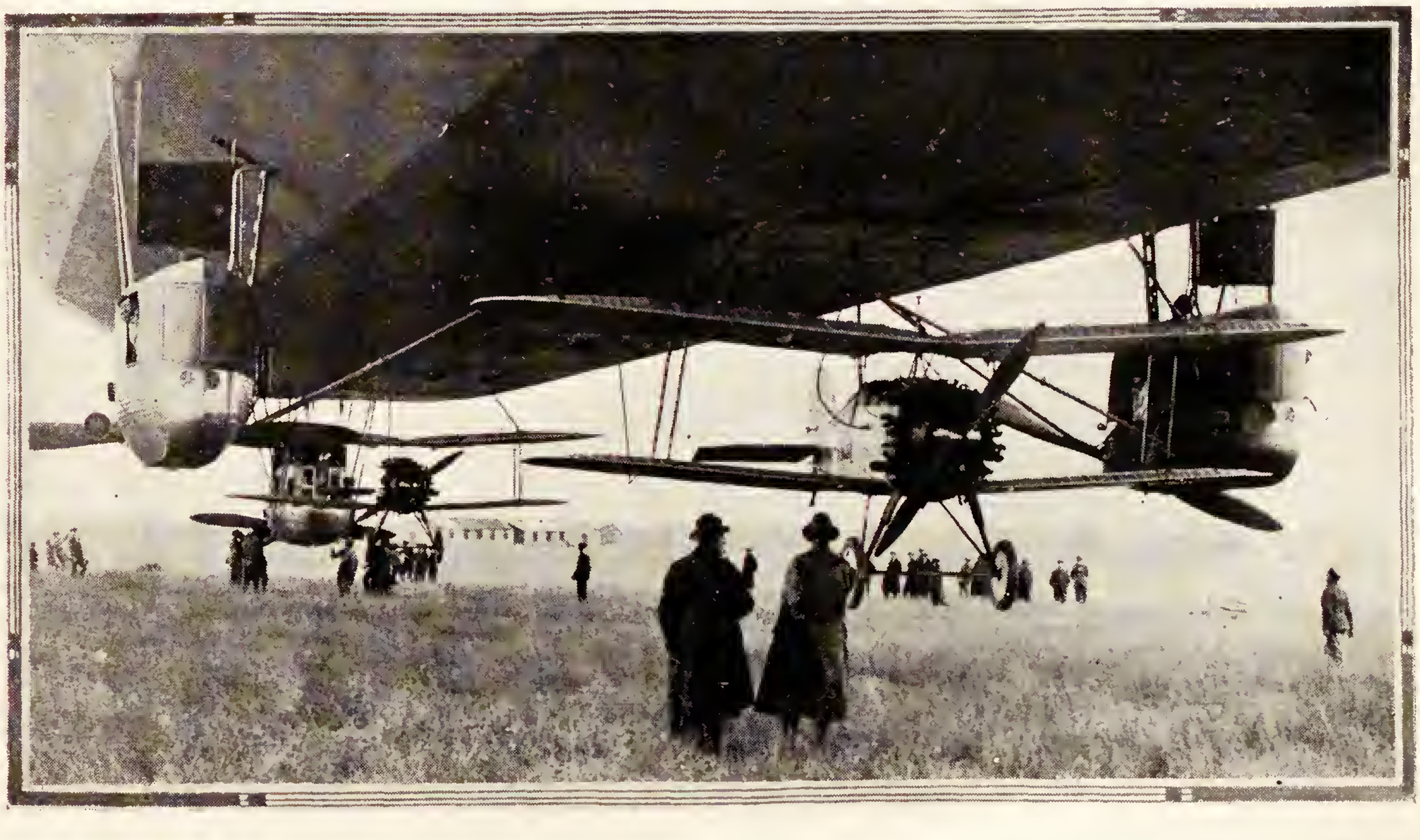
[" Flight " *Photograph*

H.M. AIR AIRCRAFT CARRIER, R.33 : The British rigid airship, R.33, with two Gloster " Grebes " attached, just before ascending from Pulham on October 21.

This time, however, the experiment was developed still further, and instead of carrying one light 'plane, the R.33 ascended with two standard Gloster " Grebe " single-seater fighters (Armstrong-Siddeley " Jaguars ") slung beneath her hull.

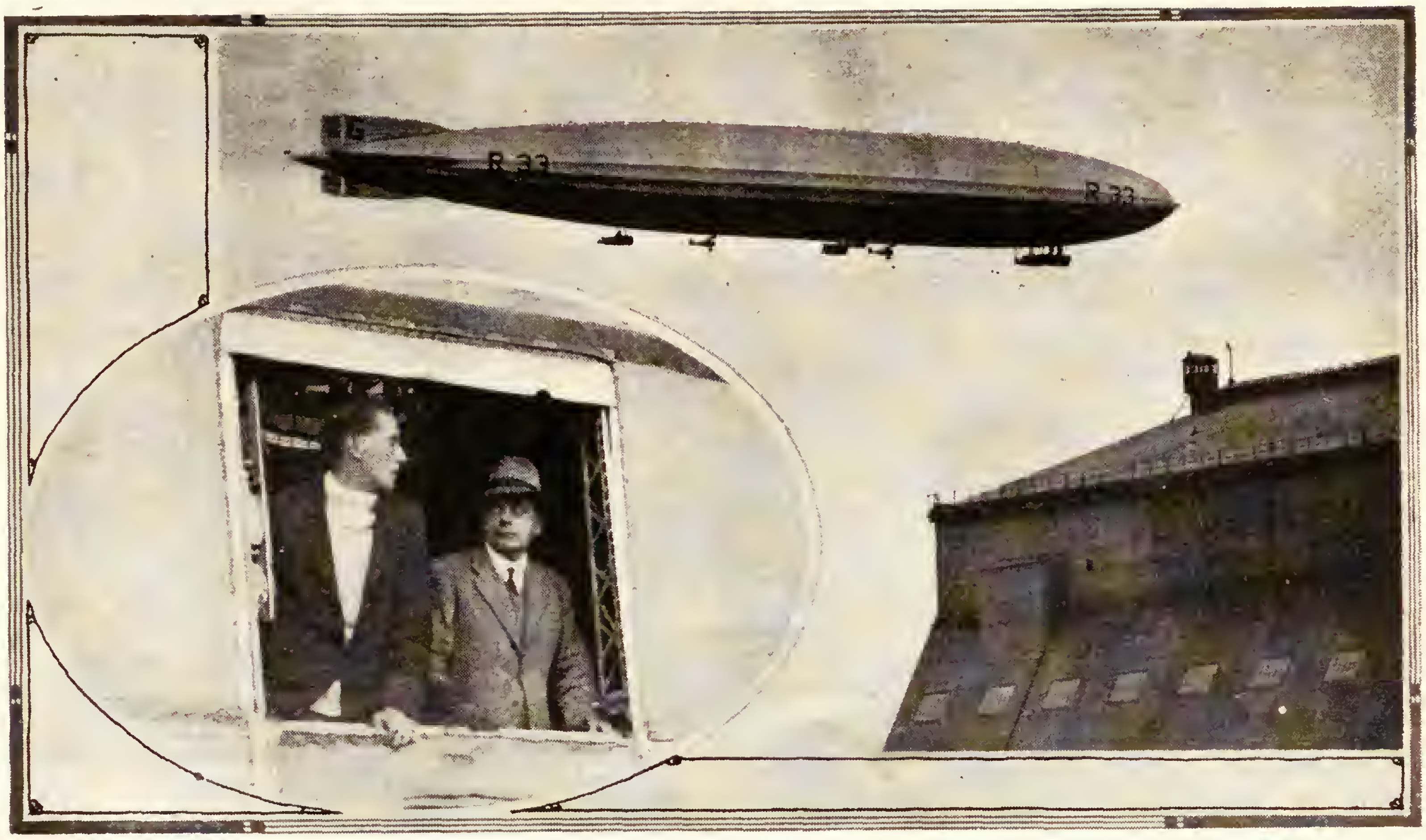
One of these machines was " released " at Pulham and the other at Cardington, where R.33 proceeded shortly after. The objects of the present experiment were : firstly, to demonstrate the possibility of employing the airship as an aircraft carrier under more practical and useful conditions than hitherto—and the experiment has certainly shown that it should be quite feasible for a number of up-to-date aircraft to be transported speedily to distant parts and successfully launched. Secondly, it also served as a test of the airship itself, as regards the effect of the sudden release of a comparatively heavy load. In this connection it should be noted that each of the Gloster " Grebes " weighed over a ton, and that each represented about 40,000 cub. ft., out of the total 2,000,000 cub. ft. of gas required by R.33, so that it was quite conceivable that the sudden extra lift thus gained by the airship, together with the release of load from a point forward, or aft, of the airship's centre of gravity, would have considerable disturbing effect upon the airship's trim. As a matter of fact, when the first " Grebe " cast off, R.33 proceeded on her way entirely unperturbed—at least, not appreciably so, to those watching on the ground below.

After a " retirement " of about a year, R.33 emerged from her shed at Pulham shortly before 9 a.m. on Thursday last, weather conditions at the time being good. Maj. G. H. Scott was in command, with Sq.-Ldr. R. Booth—who accompanied R.33 on her " night out " last year—as second in command, Capt. W. Meager third officer, and Flight-Lieut. Johnston as navigator. On board were also Group-Capt. P. F. M. Fellowes, Director of Airship Development, Wing-Comdr. W. L. Welsh, of the Flying Operations Section, Air Ministry, and Mr. W. W. Smith, of the Air Defence Experimental Establishment, Biggin Hill (in charge of acoustica



[" Flight " *Photograph*

" LIGHTER-HEAVIER-THAN-AIR ": A close-up of the R.33 (or part of same) and the two Gloster "Grebes." Each of the latter weighed over a ton, and were successfully launched from about 2,000 ft.

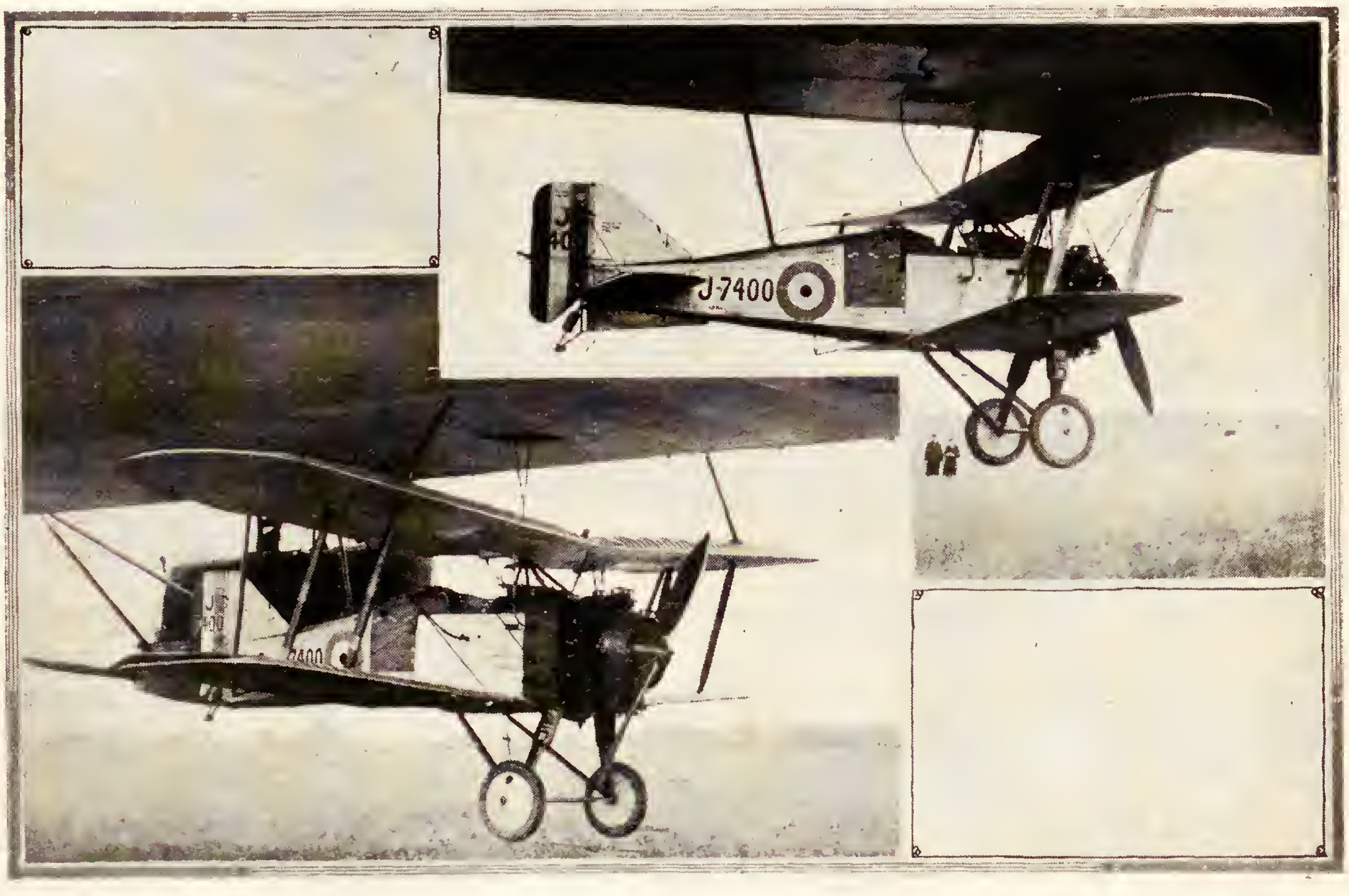


[" FLIGHT " *Photographs*

H.M. AIR AIRCRAFT CARRIER, R. 33.—The R. 33 takes the air (with two Gloster " Grebes ") once again after a year's rest. Inset, Major G. H. Scott, who was in command, and his second officer, Squad.-Leader R. Booth, in the control car.

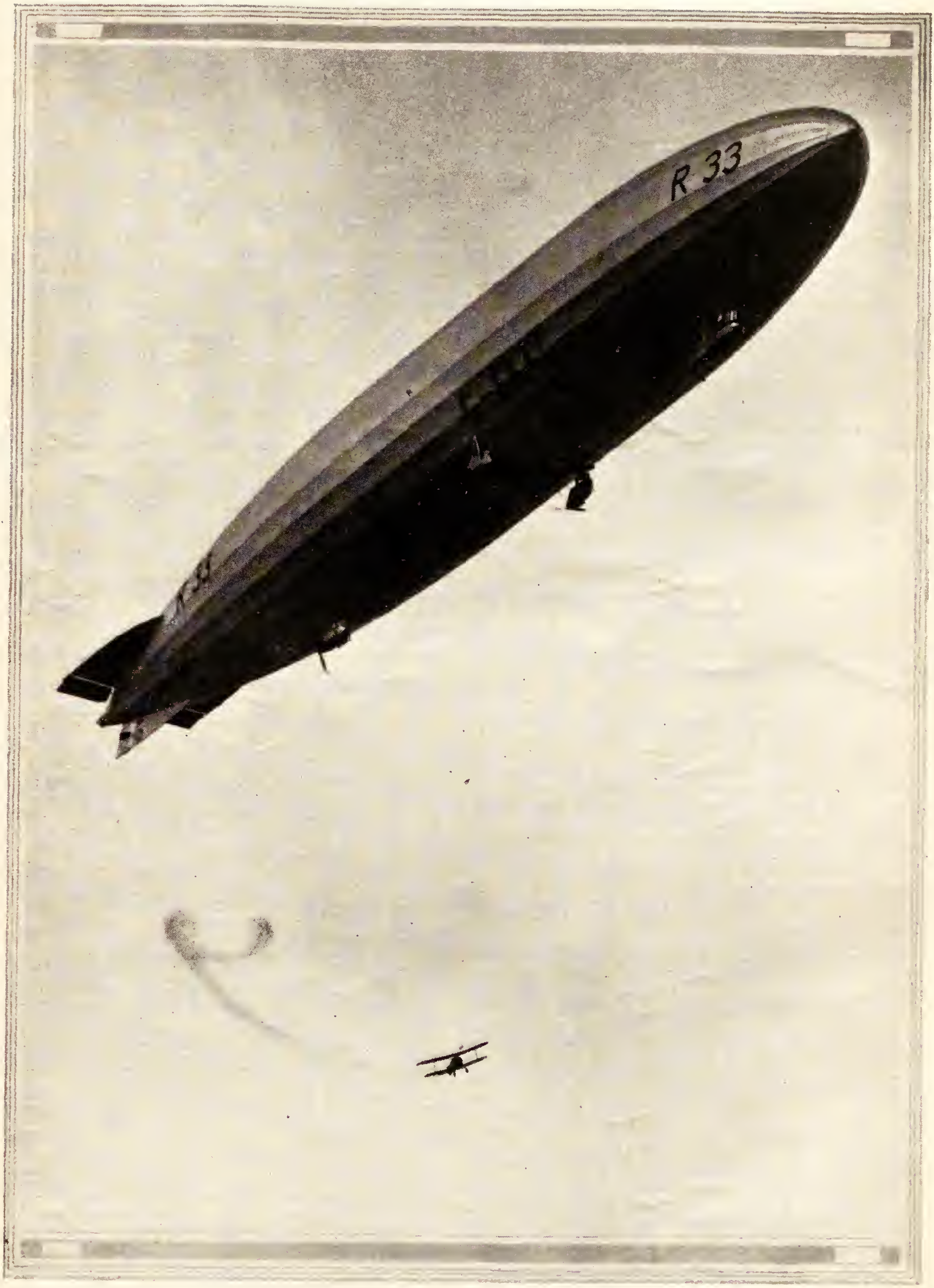
experiments. In all, the total personnel amounted to 35 persons, to which load must be added about 2½ tons for the two aeroplanes. The pilots of the two " Grebes," Flying Officers R. L. Ragg and C. Mackenzie-Richards—both of the Royal Aircraft Establishment—were, of course, also on board.

The two " Grebes " were suspended from the keel of the airship—one just forward of the two front engine nacelles,



[" FLIGHT " *Photographs*

R.33 AS AIRCRAFT CARRIER : Two detail views showing the suspension of the Gloster " Grebes " from the airship's keel. Each machine was suspended by a central quick-release attachment to the top plane centre section, whilst three struts, two to the wings and one to the fuselage near the tail, served to prevent the machine oscillating. Note the flexible piping running from the keel to the side of the fuselage, which conveyed the mixture from the Bristol " Gas " starter (in airship) to the " Grebe's " Jaguar " engine.



[" Flight " *Photograph*

" DROPPING THE PILOT "—NEW STYLE : One of the two Gloster " Grebes " carried by R.33 gets well away during the tests at Pulham last Thursday. Piloted by F/O Mackenzie-Richards, the " Grebe " fell about 100 ft. before complete control was obtained, when, opening out his engine—note the " prrrup " of smoke—the pilot made a half-roll and then flew away.

and the other some 160 ft. to the rear—by means of a central quick-release attachment to the top plane centre section, there being struts coming from the airship to points on the port and starboard wings (top) and on the fuselage, near the tail, respectively, to prevent the machine oscillating (not the wireless variety !)

Located in the airship was a Bristol gas starter, which was connected to the "Jaguars" of each "Grebe" by means of flexible piping. Access to each machine from the keel of the airship was made by means of a rope ladder from openings in the keel just above each machine.

Having been successfully manhandled from her shed, R.33 rose gracefully into the air, and was soon cruising overhead at between 2,000—3,000 ft. After circling over the station thus for about an hour and a half, the two pilots, equipped with parachutes, climbed into their respective machines.

Shortly after the "Jaguar" engines were started up ; the engine of the rear machine got going properly, but the front engine went on strike and refused to be started. Thus, at 10.17 a.m., Flying Officer Mackenzie-Richards, pilot of the rear "Grebe" pulled his release lever, and the "Grebe" dropped swiftly from the airship. It fell some 100 ft. before its pilot obtained full control and got his engine going all out—this, by the way, is indicated graphically in one of our accompanying illustrations—but as soon as this happened, it gambolled gaily in the air as if glad to be free, at last, from the maternal apron strings. F/O. Mackenzie-Richards eventually made a successful landing.

Apparently, they were still unable to start the engine of the second machine, for soon after the first machine was launched, the R.33 headed for Cardington, with "Grebe" No. 2 still in position, and it was not until 11.40 a.m., when the R.33 arrived over this place, that the engine got going and F/O. Ragg also released himself, and made an equally successful descent. In each case, the speed of the R.33 at the moment of release was about 30 m.p.h., for unlike launching an aeroplane from seacraft, it is essential that the airship's speed should be much less than that of the aeroplane, in order that the latter may quickly fall clear of the airship. On the other hand, it is not essential when launching an aeroplane from an airship for the latter to fly head to wind, whereas the marine aircraft carrier must do so, and, of course, speed is a helpful factor.

Launching the two Grebes, however, was not the only test carried out that day by R.33, for during the flight from Pulham to Cardington, tests were made in connection with the method of calculating the exact altitude of aircraft by means of acoustics. In this method use is made of the speed at which sound travels, which being a known and unvarying factor, enables extremely accurate calculations.

The procedure adopted in this method of altitude measuring is as follows : A detonator is suspended a known distance (in this case, 100 ft.) below the airship, and the charge is exploded by electrical means. A special instrument in the control car records the time that elapses between the explosion and the exact moment at which the echo returns to the airship—or, in other words, the time taken for the sound of the explosion to travel to the ground, or sea, and back again to the airship, and, therefore, the speed of sound being known, the distance the sound had to travel. In Thursday's tests, a study was made of the different character of the echo as affected by varying ground conditions, and we believe some valuable data was obtained.

At the conclusion of the tests, R.33 was berthed in the large shed at Cardington—where R.101 is under construction—but, unfortunately, during the landing operations, some slight damage was caused to the airship by some rather violent "bumps." We understand, however, the damage was not serious, and R.33 was safely housed and the two "Grebes" attached once more into position in readiness for a visit of the Dominions Premiers.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS

A Joint Meeting of the Royal Aero Club, Racing Committee, and the Society of British Aircraft Constructors was held at the Royal Aero Club, 3, Clifford Street, W.1. on Wednesday, October 20, 1926, when the following were present :—

Royal Aero Club.—Air Vice-Marshal Sir W. S. Brancker, K.C.B., in the Chair ; Lieut.-Col. W. A. Bristow ; Lieut.-Col. M. O. Darby ; Lord Edward A. Grosvenor ; Major R. H. Mayo ; Capt. C. B. Wilson, M.C. ; Howard T. Wright.

Society of British Aircraft Constructors.—Commander James Bird ; H. Burroughes ; F. M. Green ; John Lord ; T. O. M. Sopwith, C.B.E. ; H. T. Vane.

In attendance :—H. E. Perrin, Secretary, R.Ae.C. ; C. V. Allen, Secretary, S.B.A.C.

The Club submitted proposals for the races for 1927 which included the King's Cup, Aerial Derby and Grosvenor Challenge Cup.

It was decided to further consider these proposals next month

ROYAL AERO CLUB MONTHLY DINNERS

The Royal Aero Club will commence its Winter Monthly Dinners on Wednesday, November 10, next. These dinners are held at the Club and Members wishing to attend are requested to notify the Secretary as early as possible as the accommodation is limited to 60.

The subject for discussion has not yet been definitely settled.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club.

The total flying during the week was 57 hours and 50 minutes.

The following members had dual instruction :—Lady Bailey, H. Spooner, S. H. J. Garne, W. L. S. McCleod, J. L. Gardner, C. H. Tutt, V. H. Doree, J. G. Crammond, A. J. Richardson, S. C. Richards, J. J. Hofer, O. J. Marstrand, R. A. St. John, E. A. Lingard, P. W. Hoare, F. C. Elford, H. R. Presland, G. N. Howe, P. G. Lucas, D. P. H. Esler, S. O. Bradshaw, M. P. Susman, H. F. Wright, Miss O'Brian, G. W. Hall, L. Martin.

The following members made solo flights :—P. G. Lucas, E. S. Brough, A. H. M. Lees, A. R. Ogston, W. Hay, Lady Bailey, Miss O'Brian, O. J. Tapper, H. Petre, S. O. Bradshaw, N. J. Hulbert, N. Jones, W. Roche Kelly, Mrs. S. C. Eliott-Lynn, J. J. Barros, E. L. O. Baddeley, H. F. Wright.

On Monday, October 18, 1926, Lady Bailey, Miss O'Brian and J. J. Barros all successfully completed the tests for their Aviator's Certificates.

Joy rides were given to the following members : C. F. Stocks, C. G. Miesegras, J. Plisich, Miss Marks, J. L. Gardner, P. W. Hoare, R. Malcolm, R. Andrews.

Hampshire Aeroplane Club

Report for week ending October 21.—Very high winds and rain have curtailed flying during this week, weather conditions being quite impossible on two days out of the seven. The total flying time for the week was 9 hrs. 20 mins. ; instruction flying, 6 hrs. 25 mins. ; solo flying, 2 hrs. 30 mins. ; Passenger flying, 25 mins.

The following members received instruction :—Messrs. Rumble 1 hr., Bishop 50 mins., Southcliffe 50 mins., Bound 40 mins., Moloney 40 mins., Courtney W., 20 mins., Stokes 25 mins., Dickson 20 mins., Bailey 15 mins., Kerry 15 mins., Cooper 10 mins., Van den Bergh 10 mins., Perfect 5 mins., and Lieut. Graham, R.N. 25 mins.

Two joy riders braved the elements, viz. :—Mrs. Hoare and Lieut.-Commander Tucker, R.N.

In spite of the adverse weather conditions, Mr. Perfect, who flew his first solo last week, took the air nearly every day and put up a really good show.

Mr. D. Rumble successfully flew his first solo on Tuesday, within a few weeks of taking his first joy-ride.

Other soloists were Messrs. S. Fry, K. P. L. Bowen, Flying-Officer Brodie and last but not least, Capt. F. T. Courtney, the well-known test pilot with Senor De la Cierva of Autogyro fame, as passenger. Capt. Courtney demonstrated that his almost vertical descents on the Autogyro have not impaired his skill in effecting the more usual type of landing.

Yorkshire Aeroplane Club.

Report for the week ending October 20 :—Total flying time, 14 hrs. 35 mins. Solo time, 3 hrs. 50 mins. The following members flew solo : Messrs. Fielden, Wood, Norway, and Lax. Instruction, 10 hrs. 45 mins. The following members took dual instruction with Captain West ; Messrs. Williams, Wormald, Watson, Ambler, L. Dawson, Harvey, Gratwick, Pigg, Mann, Lister, Captain Beaumont.

On the first three days of this week Captain West was taking a busman's holiday at Brough to do his R.A.F. Reserve training, so that our flying time is rather below the average. However, we have several pupils ready to go solo, and we hope that by the time this report appears Messrs. Mann and Dawson will have been launched.

Early this week G-EBLS was at Brough, where Mr. Fielden managed to fly it with one hand and shoot a wild goose with the other. The goose was seen to go spinning down out of control, but a careful search later failed to reveal the body ; under these circumstances it is felt that the goose may be one up on Mr. Fielden.

Mr. Rimmer has been with us on his Avro for the last ten days. After two nights spent in holding the machine down in a field he came to the conclusion that it was time he had some sleep, and so has been flying daily from the aerodrome while carrying out a photographic survey of a part of Leeds for Messrs. Aerofilms.

We have it on the highest authority that two members have bought a pig (less engine) in a poke. The breed has not yet been ascertained, but we are told that it is a two-seater suitable for a six-cylinder in-line engine. We hear that a radial Anzani of pre-war vintage and doubtful power is available for it, and that the trial flights will be carried out by Captain West. No statement has been received from Captain West upon this matter.

At any rate, we are assured that it will not be allowed to join the Wren, whose owner continues to regard it thoughtfully. A brief interview with Squadron-Leader Longton, who described in a few well-chosen words how the machine should be flown to get out of our aerodrome, has not materially assisted the Wren into the air.

The Bluebird is still with us, but by the time these notes appear it will have gone to Croydon to show the Dominion Premiers the sort of aeroplanes we build in Yorkshire. We understand that it is then proceeding to Martlesham for its official trials.

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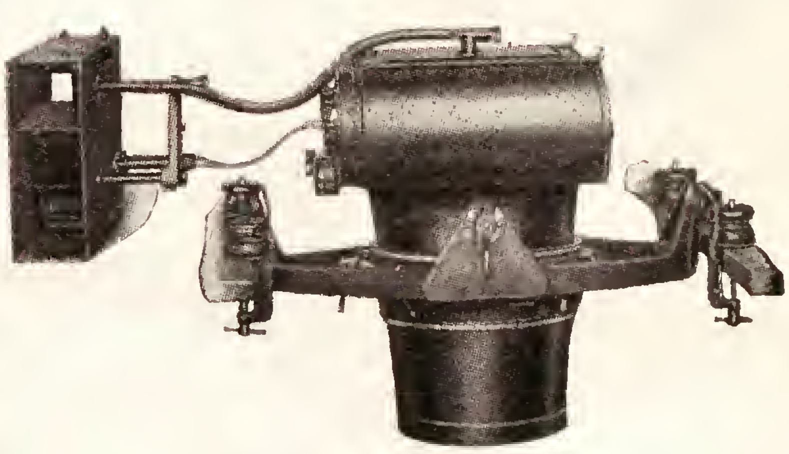

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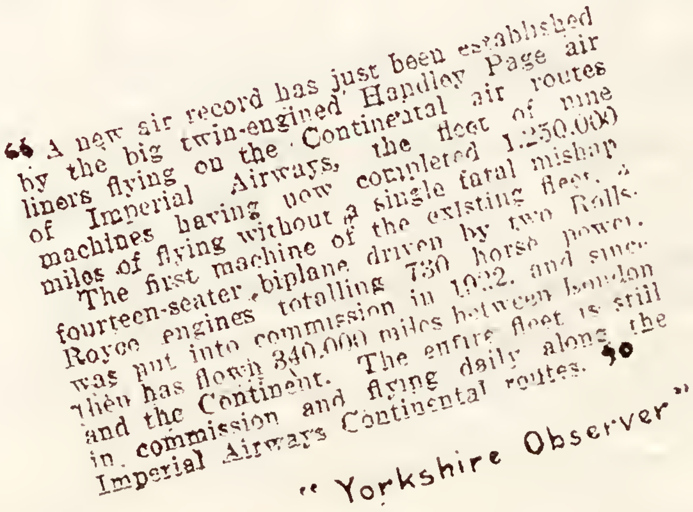

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FROM THE FOUR WINDS

Cairo-Karachi Airway

Imperial Airways announce that the first two passenger aeroplanes (D.H. "Hercules," with three Bristol "Jupiter" engines) intended for use on the 2,500-mile airway between Cairo and Karachi will leave England between December 15 and December 20. These machines are the first of a flight of five which are being built specially for the new Empire air route Air Vice-Marshal Sir W. Sefton Brancker and party will travel on one of the machines to Basra, while the other will proceed only as far as Cairo, accommodation being available for passengers on both machines. The fare from London to Cairo will be £50 and from London to Basra £101. Sir Samuel Hoare, the Secretary for Air, and Lady Maude Hoare and party will leave on a third machine on December 27, and after proceeding along the same route to Basra will continue their flight via the Persian Gulf and Karachi to Delhi. This 6,550 miles flight will constitute the official opening of the new Egypt to India service.

Italy-Brazil Flight

Sen. de Barros, the Brazilian pilot who is attempting a seaplane flight from Italy to Santos in Brazil, left Gibraltar on October 25 and arrived that afternoon at Las Palmas (Grand Canary).

Marseilles-Madagascar Flight

Lieuts. Bernard and Guibbaud, who left Marseilles in two flying-boats (one Cams-37 G.R., and one Lioré-Olivier) for Madagascar on October 12, arrived at Tangier the same day, and proceeded next morning to Casablanca. They reached Las Palmas (Grand Canary) on October 15.

Australian Pacific Flight

Group-Capt. R. Williams, Chief of Australian Air Staff, who is carrying out a survey flight of the Pacific Islands in a D.H.50 seaplane (Siddeley "Puma") arrived at Port Moresby on October 11. Rabaul (Bismarck Archipelago) was reached on October 18.

Cross-Channel 'Plane Mishap

Ten passengers in one of the Imperial Airways cross-Channel Handley Page air liners had an exciting adventure on October 21 when, piloted by Capt. F. Dismore, with Mr. Pearson as mechanic, the machine came down in the English Channel while flying from Croydon to Paris. When midway over the Channel the starboard engine failed, and the machine, losing speed, slowly descended towards the water. Meanwhile the pilot sent out the international wireless S O S—"Mayday"—and informed Croydon of what had happened, whilst the mechanic entered the cabin and handed out lifebelts to the passengers, who behaved splendidly with great calmness. A few minutes later Capt. Dismore made an excellent tail-up "landing" on the water, and the passengers—among them were five women—climbed out of the cabin through the emergency opening in the roof. At the time there was not a boat in sight, and gradually the machine began to sink at the nose, the rising water meanwhile forcing the occupants up along the fuselage near the tail. Then two motor fishing smacks were seen rushing to the rescue, having cut their gear adrift to do so. The first to arrive was the *Invicta*, which took off 10 of the occupants, all thoroughly wet but still calm. The second smack came up immediately after and rescued the remaining two. The only loss of life was a Pomeranian dog belonging to one of the women passengers. The mails and some of the valuable cargo were also salved, but the machine sank about half an hour after the passengers were taken off. The skipper of the *Invicta* served tea and other comforts to the rescued, who were taken immediately into Folkestone.

A Turkish Aircraft Factory

The first Turkish aeroplane factory was opened at Kaisarieh (Anatolia) on October 6. German as well as Turkish capital has been invested in this factory, Herr Junkers, the famous German aircraft constructor, being one of those interested in it.

Budapest-Graz Air Line

A new air line, connecting up with the Vienna-Venice line, was opened on October 14 between Budapest and Graz.

An Aerial "Boom"

Spectators on the Philadelphia flying ground were recently astounded to hear a gigantic booming voice making a few remarks from behind a bank of clouds overhead. Then came some music and singing, equally loud and penetrating. A few moments later a twin-engined biplane came into view some 5,000 ft. up, and it was from this machine the "booming" sounds came. The explanation of this new terror is stated to be an amplifying loud speaker apparatus, of enormous power, weighing about half a ton and operated by two men, which has been developed after years of research. With this apparatus, according to the *Daily Chronicle* correspondent, a word spoken in an ordinary tone into a special microphone is so magnified and radiated downward from the aeroplane that it can be made audible without distortion to those below. This "invention" is to be developed in connection with advertising, and an installation is being sent by the "Plane-Speaker Corporation" to Europe!

Another Form of Aerial "Boom"

An aerial boom of another kind also comes from America for, according to the figures issued by the Daniel Guggenheim Fund for the Promotion of Aeronautics, aeronautics has made extraordinary strides during the last few years. Last year the U.S. aircraft industry turned out products valued at $12,277,000, as against $789,872 in 1914. The establishment of the U.S. air mail service and a growing interest in aviation for other civil uses have been, it is said, factors in this advance, whilst it is stated that the aircraft industry in the U.S. may soon be free of its dependence upon War and Navy Department orders.

Aerial Prospecting in Canada

An amphibian flying boat in charge of Pilot C. S. Caldwell has returned to High River after spending four months in the Northwest Territories. The 'plane travelled between six and seven thousand miles, and was used to transport a party of three engineers who prospected for minerals. The machine alights and arises with equal ease on land or water, and the trip marks the first use of this type of machine as a mode of transport for prospecting in the Northwest Territories.

Caterpillar Killing from the Air

At the request of the Forestry Department of Alsace and Lorraine, an aeroplane has been dispatched from Paris to Strasbourg to spray the forests in the neighbourhood of Haguenau with insecticide, with the object of destroying the caterpillars which are eating up the trees. This method has, for some time past, been used successfully on the forests, etc., in America, Canada and Russia.

Guggenheim Propaganda Air Tour

Through the courtesy of Commander Richard E. Byrd, and in co-operation with the Department of Commerce, the Daniel Guggenheim Fund for the Promotion of Aeronautics is sending Byrd's North Pole 'plane on an extensive tour of the United States.

Floyd Bennett, the well-known American pilot, is piloting the 'plane on the tour which will cover the important air routes between the east and west coasts, visiting about forty cities.

The trip is being made primarily as a demonstration of the reliability and safety of commercial flying. Commander Byrd has loaned the 'plane as his contribution toward advancing the cause of aeronautics and to furthering nation-wide interest in air travel and in the use of air mail. It is hoped that as a result of the trip, towns and municipalities along the existing air routes will be encouraged to establish air ports.

Assistant Secretary William P. MacCracken, Jr., of the Department of Commerce, has given every possible aid to the officers of the Guggenheim Fund in arranging the trip. Full co-operation is also being received from the Army and Post Office air services. Through the co-operation of the latter a local pilot thoroughly familiar with local conditions will aid Floyd Bennett in piloting the 'plane between many of the landings.

The flight started from Washington on October 7, making its first stop at New York and its second at Albany. It is reported that in addition to the crew, Assistant Secretaries MacCracken, Davison and Warner, of the Department of Commerce and of the Army and Navy, will accompany the 'plane on its start of the trip from Washington.

Eagle *v.* Aeroplane

One of the U.S. air mail 'planes recently collided with a large golden eagle near Elko (Nev.), and as a result, not only was the eagle—which flew head first into the machine—killed, but the impact broke a front wing strut, compelling the pilot to make a forced landing, which was, however, successfully accomplished, but not without much skill on the part of the pilot.

Ibero-American Air Congress

The first Ibero-American Air Congress opened at Madrid on October 25, all South American States being represented. The Congress will deal with problems of international air legislation from the Spanish, Portuguese, and South American point of view, and will also study the situation of the different air routes for these countries.

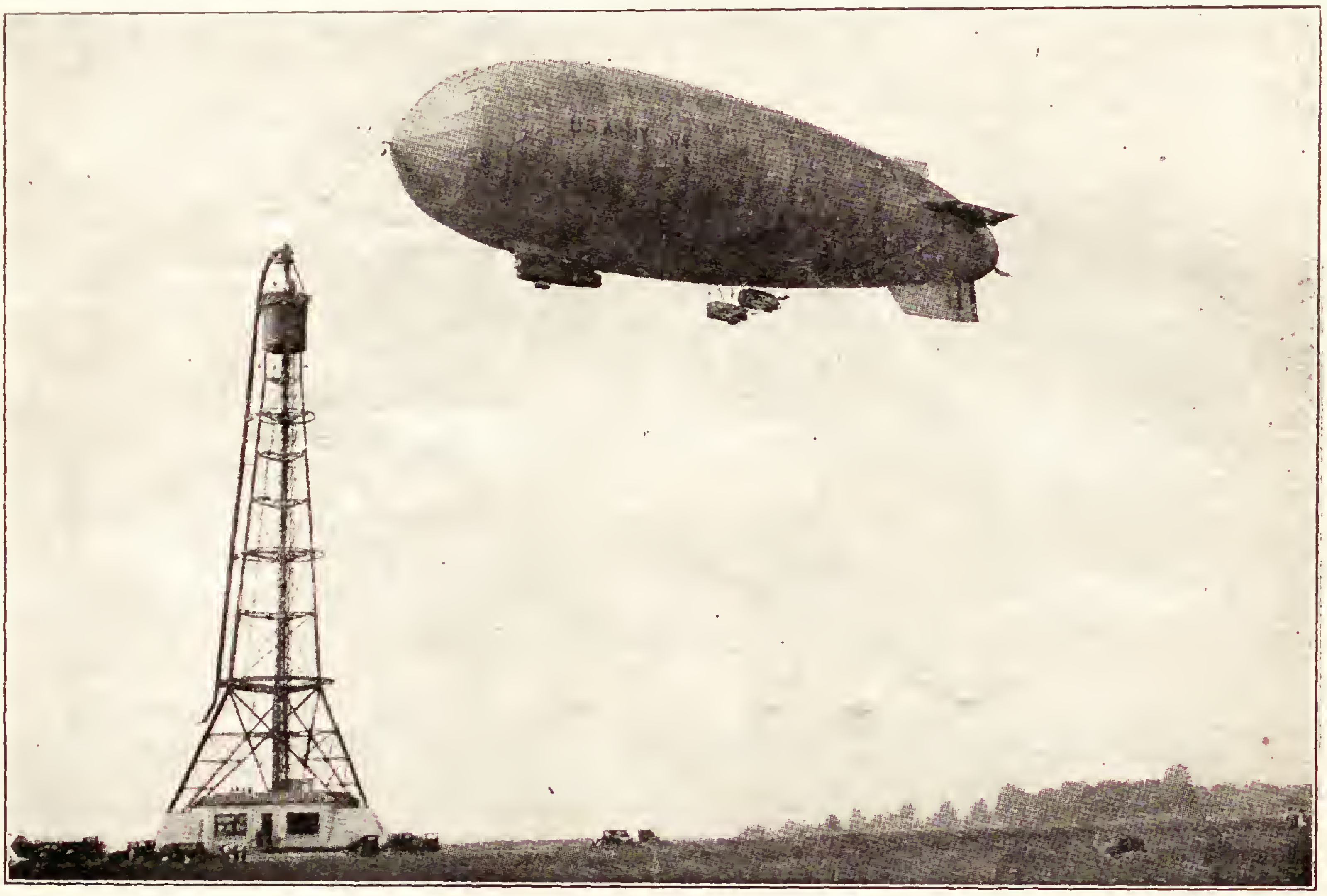
MOORING A SEMI-RIGID AIRSHIP

There can be but little doubt that aviation has an enthusiastic and practical supporter in Mr. Henry Ford, for there has been of late increasing activity in aeronautical matters associated with his name. The Ford Airport at Dearborn (Detroit) is now one of the biggest and most active civilian airports in America, and the latest development at this port is the erection of a mooring mast for airships. Furthermore, on September 18 aerial history was made when the first mooring of an airship at a privately-owned mast was successfully accomplished.

On the day in question the big semi-rigid airship RS-1, built by the Goodyear Tyre and Rubber Co. for the U.S. Army, after a night flight, under the command of Col. John Paegelow, of 450 miles from Scott Field, arrived at Detroit early in the morning. Constant wireless communication had been maintained between the Ford station and the airship, and all details of the landing were worked out before the RS-1 arrived. In the absence of an Army representative, who had a forced landing when flying *en route* to the airport, Capt. Herbert V. Theden, Air Corps Reserve and chief designer of the Aircraft Development Corp, took charge of the mooring operation—Fred Lampky, formerly of the Lakehurst Naval Air Station, assisting. Only about 15 other men were actively required in the docking manœuvre, as against about 150 generally required for the usual ground landing.

The Ford Airport and surrounding countryside were completely covered with a blanket of fog, which somewhat hindered progress, but, nevertheless, at 7.5 a.m. Col. Paegelow, after making three circuits of the aerodrome, nosed down, dropped the main mooring cable to the coupling party, and the powerful automatic winch in the tower started pulling the RS-1 down. As the airship neared the tower head its engines were run astern and the small ground party steadied the 'ship's yaw lines. The RS-1 was then made fast, water and petrol lines being immediately coupled to the 'ship's tanks, and the mooring cables withdrawn into the hull.

Henry Ford, who witnessed the entire operations from a vantage point atop of the tower, was the first to greet Col. Paegelow as he climbed out of the forward hatch—this first landing of an airship to his own tower being a proud moment for Mr. Ford, as evidenced by his smiles and remarks. Others present to welcome the RS-1 were W. B. Mayo (Chief Engineer to Henry Ford), Carl B. Fritsche (General Manager, Aircraft Development Corp.), Ralph H. Upson (Chief Engineer to same company and builder of the Ford Tower), and B. Stout (Designer of the Ford-Stout all-metal aeroplanes).



MOORING A SEMI-RIGID AIRSHIP : For the first time in the history of flying a semi-rigid airship—the U.S. Army RS-1—was moored to a privately-owned airship-mooring mast last month. This mast has been erected at the Ford airport, Dearborn, Mich. Henry Ford was at the masthead during the mooring, and was the first to greet the airship's commander, Col. John Paegelow.

The RS-1 rode at the tower all the morning, half the crew remaining on board while the other half stretched their legs below, while a constant stream of visitors climbed in and out of the 'ship, inspecting its interior, etc. Shortly after noon the airship made a preliminary weigh-off, and at 12.15 p.m. finally left the mast in perfect trim.

It was originally planned that the RS-1 should return again to the mast, after a short trip to Selfridge Field, and ride at the mast overnight, but severe storm warnings from Scott Field necessitated a change of programme, and the RS-1 returned to its base. Col. Paegelow and his officers were much impressed with the haul-down device, a feature of the tower which enables the airship to be brought down to and rested on the ground while still secured to the tower. This enables the crew to have ready access from the ground directly, and greatly facilitates servicing and loading the airship.

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The Royal Air Force Memorial Fund

The usual Meeting of the Grants Sub-Committee of the Fund was held at 7, Iddesleigh House, on October 21. Lieut.-Commander H. E. Perrin was in the Chair, and the other Members of the Committee present were :—Mrs. L. M. K. Pratt-Barlow, O.B.E., Squadron-Leader E. B. Beauman. The Committee considered in all 12 cases, and made grants to the amount of £99 10*s*.

The next meeting was fixed for November 4, at 2.30 p.m.

THE ROYAL AIR FORCE

London Gazette, October 19,1926.

General Duties Branch

The following Pilot Officers are promoted to rank of Flying Officer :—A. C. Watkins, W. F. Bryanton (August 6) ; W. A. Shorten, K. C. Baker (September 6) ; F. S. O'Hanlon (September 12) ; N. K. Howard (Sept. 17). The following are promoted to rank of Flight Lieutenant (October 13) :—G. E. Wildman-Lushington, Capt. R. M., Flying Officer, R.A.F. ; A. G. Elliot, Lieut., R.N., Flying Officer, R.A.F. The following are placed on half-pay Scale B :—Flight Lieut. A. T. Laing, from October 7 to 30, inclusive : Flying Officer F. W. C. Beaumont (October 21). The following are transferred to Reserve :—

Class A.—Flying Officers :—R. S. Higgins (October 15) ; C. Sutton (October 16).

Class B.—Flight Lieutenant :—A. J. Osborn (October 21).

The following relinquish their temp. commissions on return to Army duty (October 16) :—Flying Officers (Hon. Flight Lieutenants).—E. L. O. Baddeley (Capt., Oxf. and Bucks. L.I.), L. F. Marson, M.C. (4th 7th Dragoon Guards). Flying Officers.—G. V. Carey (Lt., Devon Regt.), P. J. Chalmers (Lt., Border Regt.), C. F. Ellicott (Lt., Dorset Regt.), J. P. Huffman, V.C. (Lt., D. of Wellington's Regt.), G. C. Oldham (Lt., Queen's Royal Regt.). Flying Officer E. A. C. Bushell relinquishes his short service commission on account of ill-health (October 20).

Stores Branch

The following are granted permanent commissions as Pilot Officers on probation with effect from dates indicated and with seniority of Oct. 9 :—J. E. R. Sowman, O. W. T. Rogers, A. A. Quayle, W. A. D. Collingwood, M. S. Shapcott, C. I. Fry, R. B. Horstmann, R. B. Brown, R. S. Sawyer, T. I. Iliff, W. A. Stagg, C. J. Nobbs, H. D. Jackman, E. H. Walker, E. G. Northway, W. G. S. Wood (October 9) ; C. L. Gilbert (October 16). Flight-Lieut. D. Mitchell is placed on the retired list (October 16).

Msdical Branch

Flight-Lieut. H. McW. Daniel, M.D., is promoted to rank of Squadron Leader (October 9). Flying Officer A. Harvey, M.B., is promoted to rank of Flight-Lieut. (October 7).

Memorandum

Sec.-Lieut. J. B. S. Forrest relinquishes his hon. commission on enlistment in the Territorial Army (September 29).

Reserve of Air Force Officers

The following are confirmed in rank :—Flying Officer—W. Steele, D.F.C. (October 13). Pilot Officers.—O. M. Shell-Small (October 7) ; L. W. Van Oppen (October 19).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Squadron-Leaders : A. F. A. Hooper, O.B.E., to R.A.F. Base, Gosport, on transfer to Home Estabt., 25.9.26. A. H. Stradling, O.B.E., to H.Q., Egypt, 8.10.26.

Flight -Lieutenants : H. O. Long, D.S.O., to No. 30 Sqdn., Iraq., 1.10.26. R. Harrison, D.F.C., to Aircraft Depot, Iraq, 1.10.26. R. L. Sweeny, to H.Q., Iraq, 30.9.26. F. E. C. Benstead, to No. 4 Armoured Car Co., Iraq., 30.9.26.

Flying Officers : W. A. D. Brook, to H.Q., Iraq, 15.10.26. (Hon. Flight-Lieut.) F. L. Woledge, to H.Q., Iraq, 1.10.26. V. G. H. Gee, to No. 47 Sqdn., Egypt, 7.10.26. G. N. J. Stanley-Turner, to Aden Flight, 1.10.26. A. L. Ottway, to No. 6 Armoured Car Co., Iraq, 1.10.26. C. B. Wincott, to No. 402 Flight, Mediterranean, 15.10.26. O. B. Swain, to Armament and Gunnery Sch., Eastchurch, 18.10.26.

Pilot Officer L. M. S. Knight, to R.A.F. Depot, Uxbridge, on transfer to Home Estbt., 28.9.26.

Stores Branch

Flight Lieutenant F. Whilton, D.C.M., to H.Q., Cranwell, 14.10.26.

Flying Officer A. E. Connolly, to H.Q., Cranwell, on transfer to Home Estabt., 25.10.26.

Pilot Officer C. L. Gilbert, to H.Q., Cranwell, on appointment to a Permanent Commn. (on probation), 16.10.26.

Accountant Branch

Flying Officers : J. J. T. Rose, to R.A.F. Depot, Egypt, 1.10.26. J. Charles, to Heliopolis Details, Egypt, 7.10.26.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS (S.M.A.E.)

As previously reported in the S.M.A.E. notices, the Society sent over three models to America to compete in the Mulvihill Trophy Contest, held at Philadelphia, in September, and reports of this event are now to hand from the U.S.A.

The competition was to be decided solely on the best duration of three flights, the only restriction being that the wing-span should not exceed 40 in. Our machines arrived in America a week before the contest, and during this time were "tuned up" by Mr. Oscar Westgate (an experienced aeromodellist in that country) who also flew the models for us in the actual competition.

The day of the contest (Monday, September 6, 9.30 a.m.), saw 55 models on the Philadelipha Aerodrome, 22 of which competed for the Trophy. The three British entrants representing the S.M.A.E. were : (1) D. A. Pavely ; (2) S. C. Hersom ; (3) T. H. Newell.

The competition proved to be an exceptionally good one as the final results show, the durations from the 5th place downwards being particularly close.

Mr. S. C. Hersom's and Mr. T. H. Newell's models put up durations of 1 min. 31·5 secs. and 1 min. 31·4 secs. respectively. As this was the first occasion on which the S.M.A.E. has participated in an international flying competition, the obtaining of 4th place is very encouraging.

Mulvihill Trophy, 1926—held at Philadelphia, U.S.A.

Position.	Name.	Club represented	Duration of flight.	Prize.
			min. secs.	
1	J. Loughner	Michigan Model Airplane Club	2 31·4	Mulvihill Trophy and 200 dollars
2	J. Lucas ..	Illinois Model Aero Club	2 9·4	100 dollars
3	B. Pond ..	Illinois Model Aero Club	1 57·4	75 dollars
4	D. A. Pavely	Society of Model Aeronautical Engineers	1 38·2	50 dollars
5	A. O. Heinrich	—	1 34	30 dollars

This year's flying programme having now come to an end, the Society's indoor meetings will be held at Headquarters (Central Y.M.C.A., Tottenham Court Road, W.C.1), on Friday evenings, at 7.30, on the following dates :—November 5, November 19, December 3, and December 17.

B. K. Johnson, *Hon. Secretary.*

Sir Samuel Hoare

The Secretary of State for Air, Sir Samuel Hoare, addressed a meeting of the City of London Debating Club on October 14, his subject being "Some Aspects of Imperial Defence," in which he made some important references to the Air Service, airships, etc.

Sir Samuel Hoare will be the guest of the evening at a political house dinner to be held at the Ladies' Carlton Club on Friday, November 5. Lady Newton will preside.

The Citizen Air Force in Training

The two London squadrons, No. 600 (City of London) Bombing Squadron, and No. 601 (the County of London) Bombing Squadron, recently completed their first annual training, at Manston Aerodrome, Kent, and Lympne Aerodrome, near Hythe, as did the two northern squadrons No. 602 (Glasgow) and No. 603 (Edinburgh), stationed at Leuchars Air Station, seven miles south-east of Dundee. Practically all the *personnel* available attended, in many cases for the full 15 days' training The total of 27 officers and 194 airmen of the Auxiliary Air Force underwent training on an aerodrome this year. The force was only instituted a year ago. Another squadron, No. 605 (City of Birmingham), is now being formed, with its aerodrome at Castle Bromwich. Squadron-Leader Cecil Wright, who served with the Royal Air Force in the war, and has now taken refresher courses, has been appointed officer commanding.

Royal Air Force Flying Accident

The Air Ministry regrets to announce that as the result of an accident at Moascar, Ismailia, Egypt, to a Bristol Fighter of No. 208 Squadron, Moascar, on October 18, Flying Officer Vincent Bingham Bingham-Hall, M.C., the pilot of the aircraft and P.O. 15,909 Marine William Higgins, Royal Marines, were killed

AIR POST STAMPS

By Douglas B. Armstrong

(*Editor of "The Stamp Collector"*)

Inland Air Post in Uruguay

A fourth stamp was added to the latest air mail series of Uruguay in the so-called "Seagull" design, on March 17, in the form of a 25 centisimos denomination, printed in purple. It was used exclusively in connection with a series of experimental flights which were carried out between Montevideo and Rocha and *vice versa*, with the object of ascertaining the possibilities of a regular air post service to the interior, on March 17, 19, 22, 24, 26 and 28.

Early Date Egyptian Covers

In a recent instalment of these jottings we gave the date of issue of the new Egyptian air post stamps as March 10, which is that generally accepted. Mr. J. Franklin informs us, however, that he has a cover in his collection that was carried from Cairo to Baghdad by air on March 9, and was prepaid by the 27 milliemes stamp. It seems that about 100 letters were flown on the earlier date, and they should be well worth hunting for in view of the growing importance that is rightly attached to "first flight" covers by air post specialists.

U.S.A. Contract Air Mails

Some highly interesting air post covers have resulted from the inauguration of contract air mail services over various intermediate routes under authority of the United States Post Office Department.

The first of these services was put in operation between Detroit, Chicago and Cleveland by the Ford Motor Co. on February 15, 1926, when a special cachet was applied to air-borne correspondence consisting of a large double-lined circle with the town name and date in the centre, and inscription "FIRST FLIGHT INAUGURATING CONTRACT AIR MAIL SERVICE in U.S.—CHICAGO—DETROIT—CLEVELAND."

Cachets of a similar type were employed on the institution of contract air mail lines connecting Jacksonville-Tampa-Fort Myers-Miami (on April 1); Elko-Boise-Idaho-Pasco (on April 6); Salt Lake City-Las Vegas-Los Angeles (April 17); and Chicago-Moline-St. Joseph-Kansas City-Oklahoma City-Fort Worth-Dallas (May 12).

The home-town of Abraham Lincoln, Springfield, Illinois, indulged in a more ambitious form of cachet supplemented by a souvenir postmark which includes a medallion portrait of Lincoln followed by the words "FIRST FLIGHT—CONTRACT AIR MAIL Chicago-St. Louis Route. Inaugurated April 15." A certificate was published by the Postmaster of Springfield that this special cancellation would never again be used, and the public was urged to "mail some letters on the first flight."

Three other contract routes authorised under the scheme have yet to be opened up to regular service, viz., Boston to New York *via* Hartford (Conn.); Seattle (Wash.) to Los Angeles (Cal.) *via* Portland, Medford, Sacramento, San Francisco, Fresno and Bakersfield; and Chicago to Minniapolis *via* Milwaukee, La Crosse and St. Paul. Particulars of the cachets used in these instances will appear in this column in due course.

Chilian Air Stamps in Sight

From time to time there have been rumours of the impending establishment of an official air post service connecting the principal towns of Chile. The latest report is to the effect that a special series of air post stamps is in preparation for issue when the projected air mail line is opened.

Latest Swiss Flights

The opening of a new air post line from Chaux-de-Fonds to Basle on May 15, 1926, was attended by the issue of souvenir cards and envelopes designs by the eminent Swiss artist L'Eplatternier, and inscribed "1 ere Poste Aerienne La Chaux de Fonds (La Locle), Bale." The cards were sold for 10 centimes each, and the envelopes (for printed matter) for 5c. in addition to the regular postage. Flown covers bore in addition the impression in violet of a rectangular cachet containing the winged wheel emblem of the Societe Navigation Horlogere Aerienne Nhora, under whose auspices the service is maintained.

A special air post flight was authorised by the Swiss Ministry of Posts and Telegraphs in connection with the tenth annual Trade Fair held at Basle on May 28, when private air postcards and vignettes were provided by the Fair organisers. A particular postmark was also granted with the following inscription, "Flugpost Basel Luzern, 28 Mai 1926, 10 Jahriges Jubilaum der Schweizer Mustermesse in Basel."

PUBLICATIONS RECEIVED

Northampton Polytechnic Institute Announcements, Educational and Social, for the Session, 1926-1927. The Northampton Polytechnic Institute, 280, St. John Street, London, E.C. 1.

Aluminium Foundrywork. The British Aluminium Co., Ltd., Adelaide House, King William Street, London, E.C. 4.

The Book of the Aeroplane. By Capt. J. Laurence Pritchard. Longmans, Green and Co., 39, Paternoster Row, London, E.C. 4. Price 7*s.* 6*d.* net.

Aeronautical Research Committee Reports and Memoranda: *No.* 1029 (E. 20).—Hydrogen as an Auxiliary Fuel for a Solid Injection Oil Engine By G. F. Mucklow. April, 1926. Price 1*s.* net. *No.* 1032 (*Ae.* 224).—Wind Tunnel Tests on a Wing Covered with Monel Metal Gauze. By F. B. Bradfield. February, 1926. Price 4*d.* net. H.M. Stationery Office, Kingsway, London, W.C.2.

Rolls-Royce Bulletin. October, 1926. Rolls Royce, Ltd., 14, Conduit Street, London, W.1.

The Accessory. October, 1926. *Vol.* 12. *No.* 130. Brown Brothers, Ltd., Great Eastern Street, London, E.C.2.

The Effect of Reduced Intake—Air Pressure and of Hydrogen on the Performance of a Solid-Injection Oil Engine. By G. F. Mucklow, M.Sc. The Institution of Automobile Engineers, Watergate House, Adelphi, London, W.C.2.

Monthly Journal of the British Empire Chamber of Commerce in the United States of America. August, 1926. *Vol.* 6. *No.* 9. The British Empire Chamber of Commerce in the United States of America. 25, Broadway, New York, U.S.A.

Book of Laws and Regulations of Civil Aviation. The Aviation Publishing Offices, Moscow.

Catalogues

The "Jubilee" Worm Drive Clips. L. Robinson and Co., London Chambers, Gillingham, Kent.

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AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1925

Published October 28, 1926.

14,561. J. B. Strauss. Flying machines. (258,917.)
14,562. J. B. Strauss. Dirigible flying machines. (258,918.)
16,732. A. J. and F. Harpstrite. Air, land, and water craft. (258,935.)
16,954. Sir W. G. Armstrong, Whitworth and Co., Ltd., and N. A. Graveson. Valves for use in high-pressure systems. (258,949.)
17,905. T. Williams. Screw propellers. (258,972.)
18,810. H. Junkers. Method of and means for, constructing elongated hollow bodies such as bodies of aircraft. (238,213.)
20,698. V. H. Gregory. Aneroid altimeters, etc. (258,991.)
21,791. W. P. Barnhill. Safety devices for aeroplanes. (259,004.)
27,979. O. Geisler. Stabilizer for airships. (248,324.)
31,450. A. Meyer. Screw propellers. (259,068.)

APPLIED FOR IN 1926

Published October 28, 1926.

10,392. A. Lamblin. Diaphragm pumps. (255,823.)
15,444. E. Thoresen. Apparatus for sky-writing. (259,156.)

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From Dr. V. Langsdorff (Passenger).

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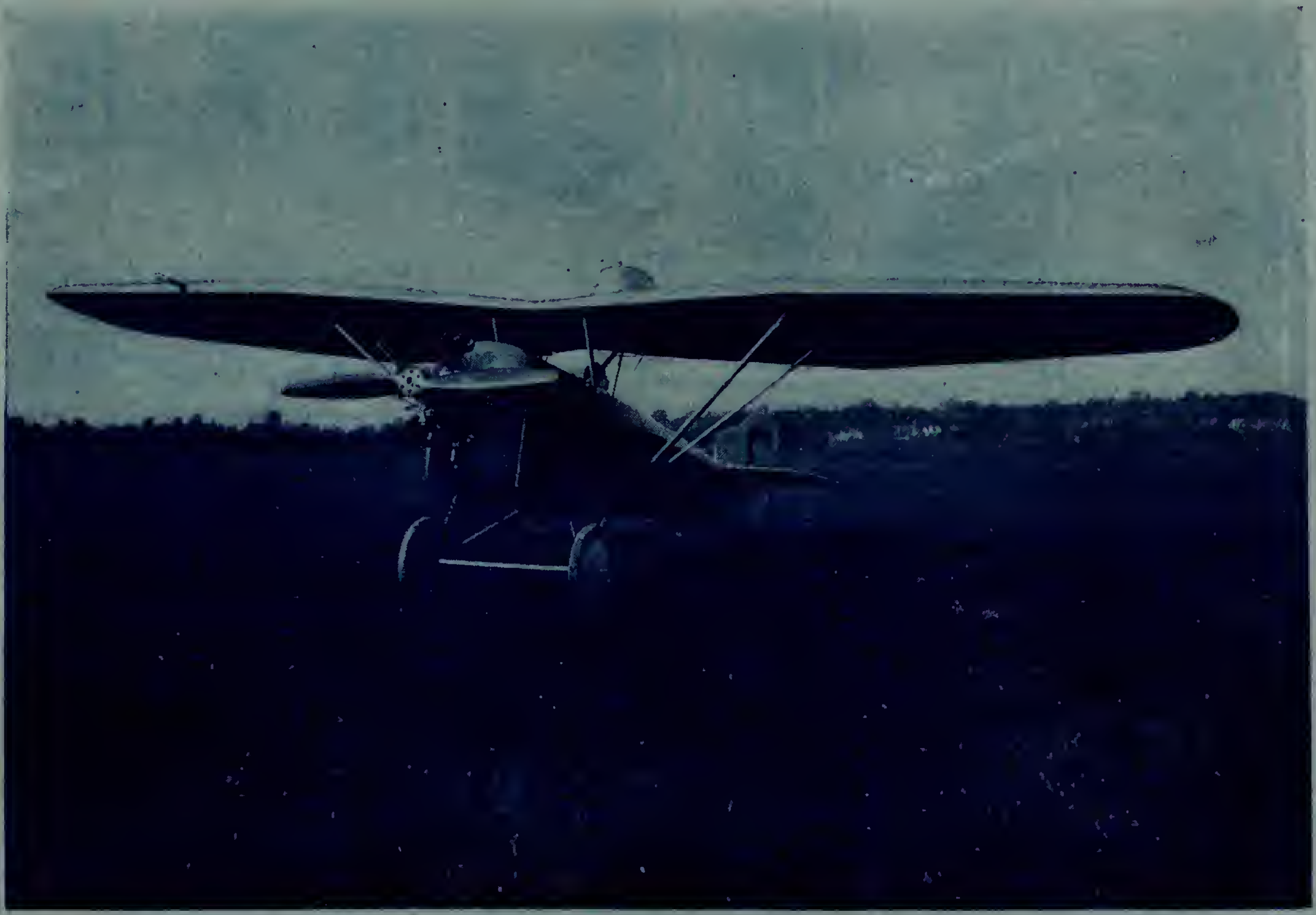

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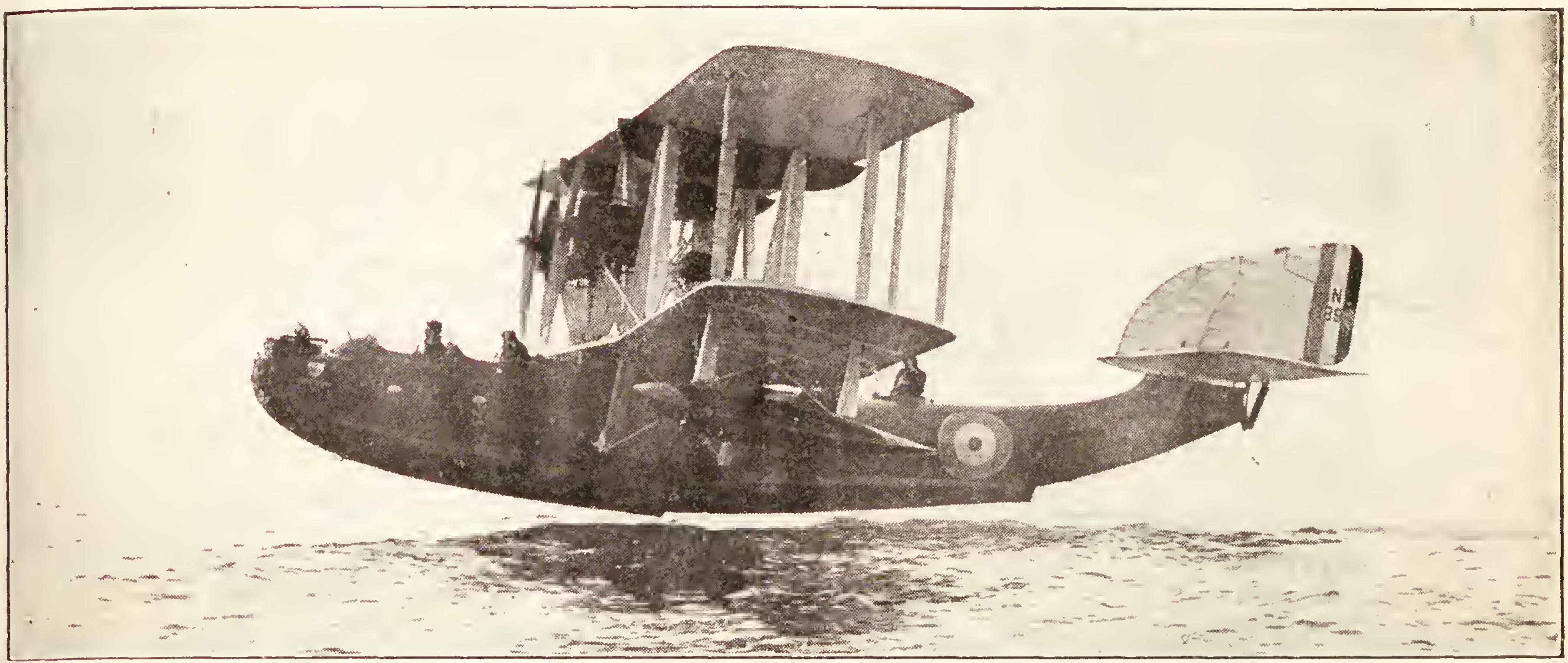

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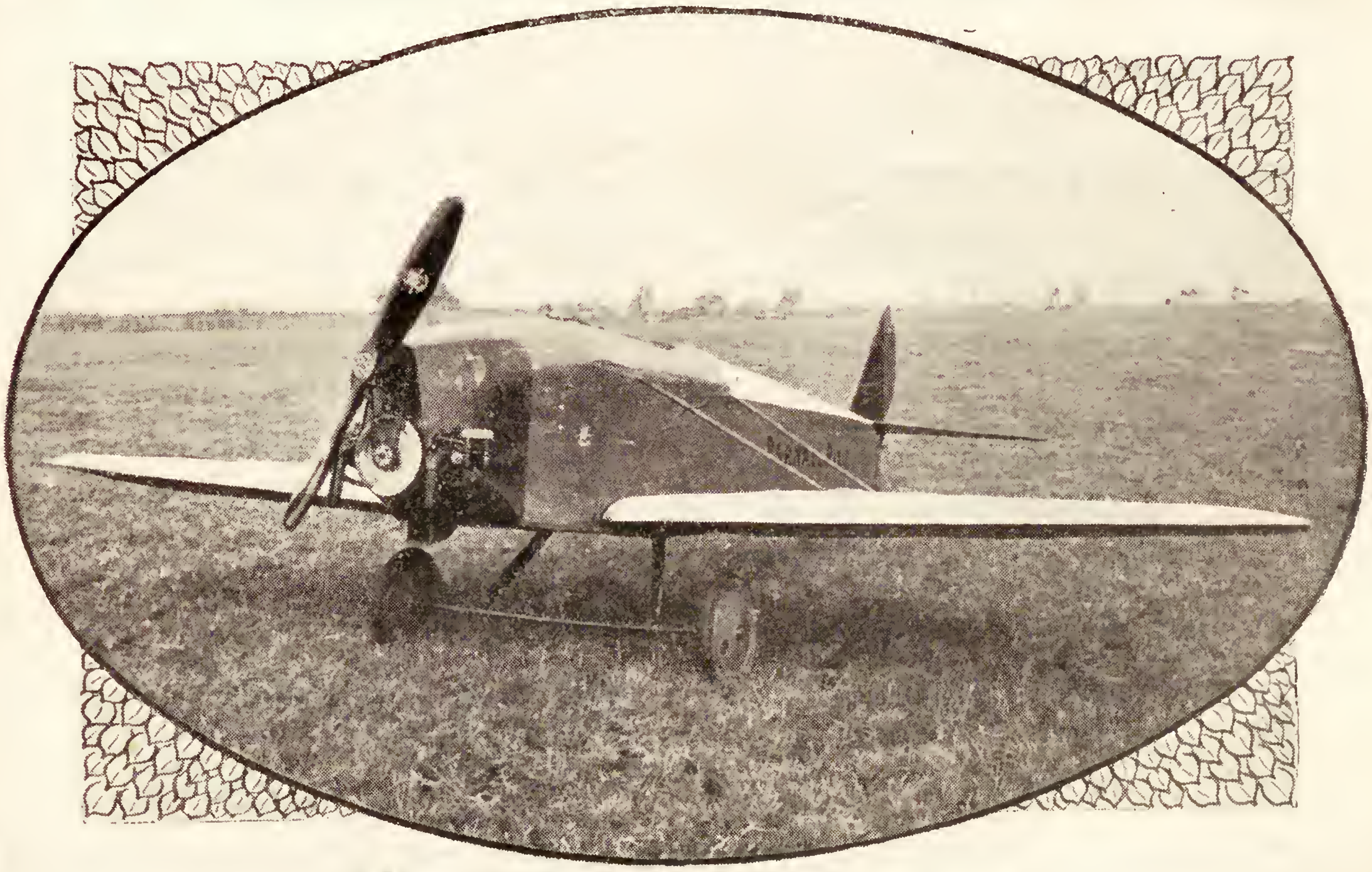

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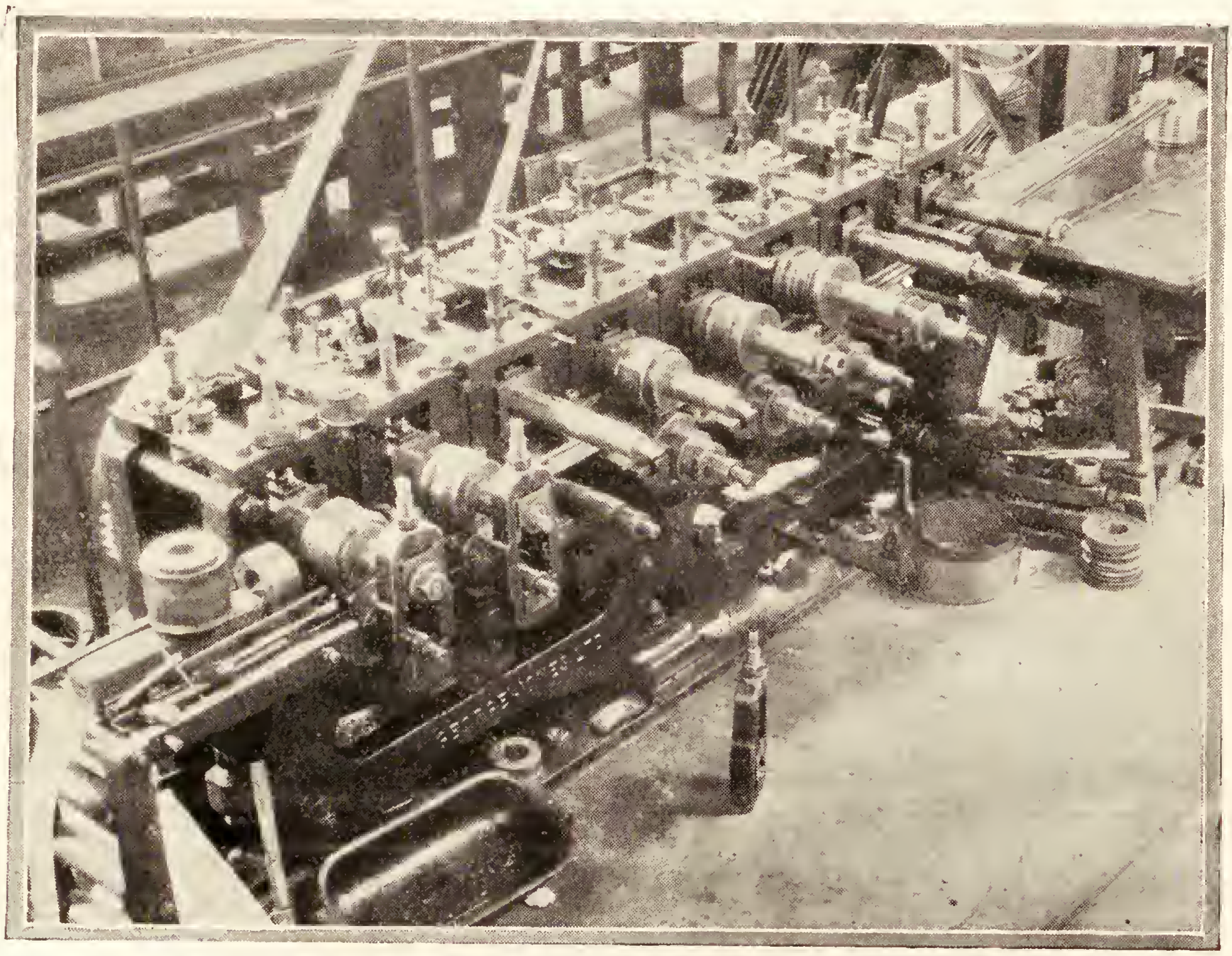

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No. 932. (No. 44, Vol. XVIII.) NOVEMBER 4, 1926 [Weekly, Price 6d. Post free, 7d.

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Nov. 4	Mr. G. F. Mucklow. "Hydrogen as an Auxiliary Fuel for a Solid Injection Engine." Joint Meeting R.Ae.S. and Inst.A.E.
Nov. 11	Schneider Cup Race at Norfolk, Virginia, U.S.A.
Nov. 16	Mr. A. G. von Baumhauer, Sub-Director of the Government Aeronautical Laboratories, Amsterdam. "Some Notes on the Possibilities of Progress in Aviation," before Inst.Ae.E.
Nov. 18	Mr. R. S. Capon. "Methods of Performance Testing and Analysis," before R.Ae.S.
Nov. 21	Lecture, "Meteorology in the Service of Man," by Dr. G. C. Simpson, C.B., at the Guildhouse, Eccleston Square, S.W.1.
Nov. 30	Mr. F. S. Barton, M.A., F.Inst.P. "Air Photography Apparatus," before Inst.Ae.E.
Dec. 2	Mr. P. B. Bradshaw. "Alloy Steels for Aero Work," before R.Ae.S.
Dec. 3-19	Paris Aero Show

EDITORIAL COMMENT.

Empire Aviation

"I AM proposing for your consideration the creation of these two long-distance air routes upon what I will call a mosaic plan. We are all too hard up for any one of us to undertake the heavy cost of an air route to Singapore or an air route to Cape Town. If, then, we are to form these routes, we must each of us insert our particular stone in the design. I have suggested a way in which we might each take our share and in which, what is no less important, military and civil aviation might co-operate at least for the pioneer work. My proposal involves no subsidy; it involves nothing more than co-operation between one Government and another and between military and civil flying."

This sentence, quoted from the speech made by the Secretary of State for Air, Sir Samuel Hoare, to delegates and representatives of the Imperial Conference gathered on October 28 to discuss Imperial Air Communications, sums up in a few words the broad fundamental principle upon which must be based future British aviation policy if full advantage is to be taken of the incalculable potentialities which the air holds out. In our issue of October 21, 1926, we stated in these columns: "The all-important subject, however, so far as the Imperial Conference is concerned, will undoubtedly be that of Dominion participation in financing Empire Aviation. We believe that all the representatives fully realise the importance of this, and, consequently, we look forward hopefully to the Conference bearing fruit." The spirit which has been evident during all the discussions that have taken place so far has been such as fully to justify that hope. Without exception one and all of the Dominion representatives have expressed willingness and indeed determination, to share in the expenses of organised Empire air routes, in return, naturally, for a voice in the organisation of such routes.

Elsewhere in this issue of FLIGHT we give a very extensive resume of Sir Samuel Hoare's speech and of the contributions to the discussion which followed it. We make no apology for taking up so much space with "heavy" matter, since the subject is one the vital importance of which cannot well be exaggerated. As we have repeatedly pointed out in these columns, there is one way, and one way only, in which aviation can be made of the greatest possible service to the British Empire, and that is by planning it on Imperial lines. In his speech Sir Samuel Hoare pointed out that although he was on that occasion confining himself to the civil side of the question, the civil and military aspects were inextricably connected, and that the development of Imperial air lines, whether by aeroplane or airship, was a vital factor in the problem of Empire defence. He outlined what had already been accomplished at home, not, as he said, because he underestimated what had been done in Australia and Canada, for instance, but because he was for the moment taking London as the terminus of the principal Empire air routes. And he asked whether it would be possible for the Government of India to consider the extension of the Cairo-Karachi route, which will be opened next year, on to Bombay and Calcutta, and for the Government of Burma to carry it a stage farther by extending the service to Rangoon. At the far end of the route Sir Samuel suggested that the Air Force of Australia might, at any rate experimentally, join up with an occasional service. Similarly in Africa, the Secretary of State for Air suggested that linking up with the experimental service being organised by a private company with the help of the Governments of Kenya, Uganda, and Sudan, and continuing the Khartum-Kisumu route, lines should be established in the north between Egypt and Khartum, and in the south between Kisumu and Cape Town. He expressed willingness on the part of the Mother Country to arrange for a certain number of flights to carry mails and passengers by R.A.F. machines between Egypt and Khartum, and asked whether South Africa would consider the making of a certain number of flights by the South African Air Force between Cape Town and Uganda. In the meantime we at home should be interesting ourselves in the link between London and Egypt. Evidently pending the establishment of airship services, although he did not definitely say so, work is progressing on seaplanes and Sir Samuel Hoare remarked that already considerable progress had been made with the development of flying boats suitable for the passage of the Mediterranean. It is now several years ago that FLIGHT first pointed out the necessity for encouraging seagoing flying boats or seaplanes capable of operating on Empire air routes, and we are therefore extremely gratified to have the assurance of the Secretary of State for air that this important subject is being kept well in mind and that progress is being made. The seaplane is a necessity to the first stage of an "all-red air route operated by heavier-than-air craft, and we do know what seaplanes are capable of, while we still have to discover the capabilities of the airship.

During the discussion following Sir Samuel Hoare's speech practically all the delegates expressed their willingness to help, Lord Winterton, Parliamentary Under-Secretary of State for India, in particular being emphatic in his statement that the view of the Indian Air Board was that the Government of India should claim a right to participate as a principal in any contracts for air services in which India was interested.

During his speech Sir Samuel Hoare made the most valuable suggestion that if possible arrangements should be made for holding, between now and the next Imperial Conference, an *Imperial* Air Conference at some suitable centre in the Empire. We sincerely trust it will be found possible to carry this suggestion into effect. Altogether the discussions that have so far taken place leave one with the feeling that at last we are on the right track and are making up our minds to tackle aviation Imperially.

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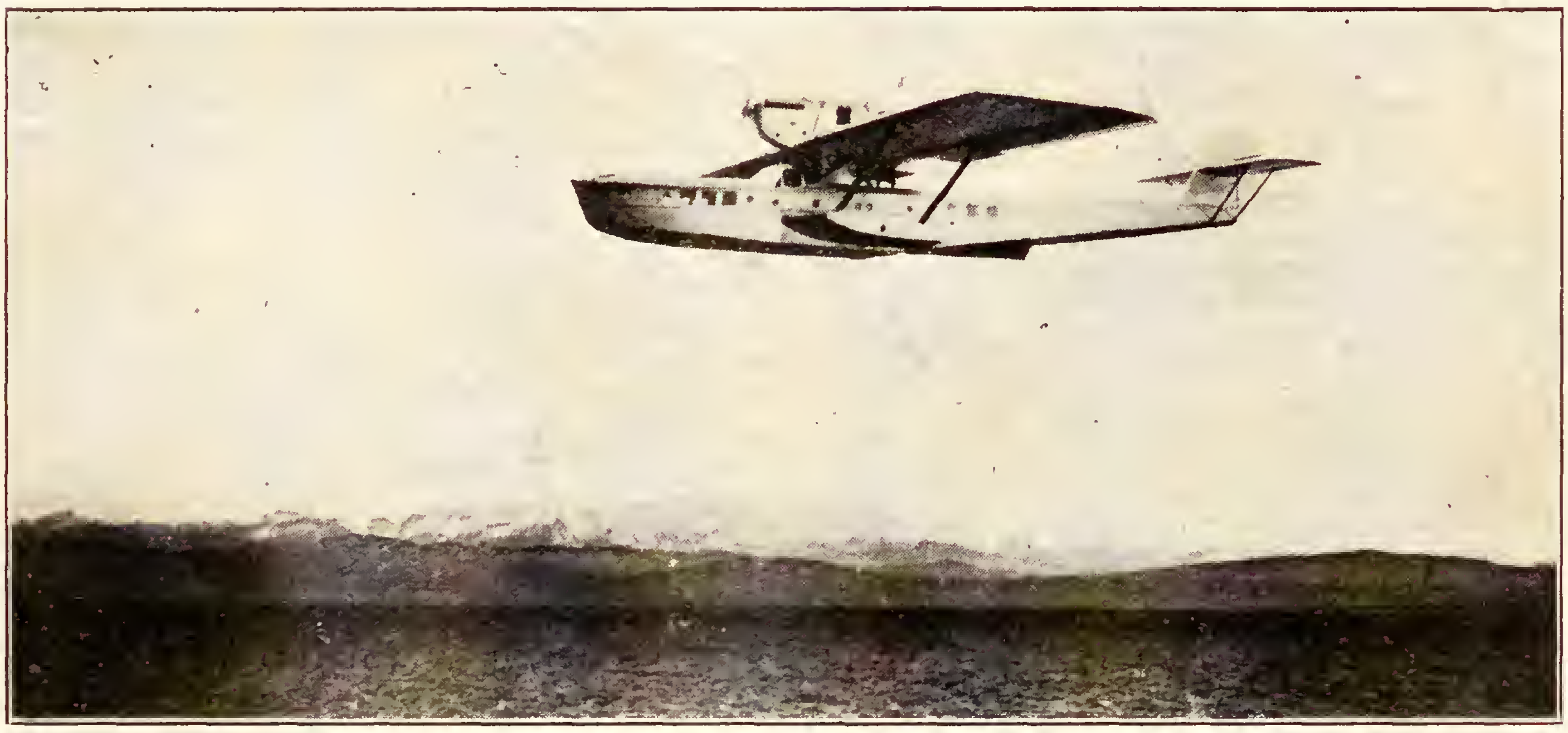

A 1,300-H.P. FLYING BOAT: This photograph shows the new Dornier "Super-Wal," fitted with two Rolls-Royce "Condor" engines, in flight over Lake Constance, where it recently underwent its first flying tests. This machine has seating accommodation for 21 passengers in two separate cabins. An idea of the size of the machine may be formed when it is pointed out that the wing span is 28·5 m. (93 ft. 6 in.) and the wing area 143 sq. m. (1,540 sq. ft.).

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OFFICIAL REPORT.

Parliamentary Debates

HOUSE OF COMMONS.

Vol. 192. No. 18. Thursday, 25th February, 1926.

"**The SECRETARY of STATE for AIR (Sir Samuel Hoare):** ... ... Last year the Air Force carried out a series of remarkable long-distance flights in the neighbourhood of the British Isles. Here are one or two of them. On 24th September, five Vickers' Virginias, from No. 9 Bombing Squadron, flew from Manston, in Kent, to Leuchars, the most Northerly air station in the British Isles, and back to Manston in a day, a distance of 870 miles. A second flight was undertaken by eight Vickers' Virginias from Worthy Down, in Hampshire, again to Leuchars, on 3rd September. Although the weather was very bad, three of the machines flew from Hampshire to Edinburgh and back without landing.

Lieut. Commander BURNEY: With full service load?

Sir S. HOARE: Yes, with full service load, and as an ordinary service exercise, and not in any way as a stunt. They flew a distance, of about 800 miles, spending as much as 12½ hours continuously in the air ... ..."

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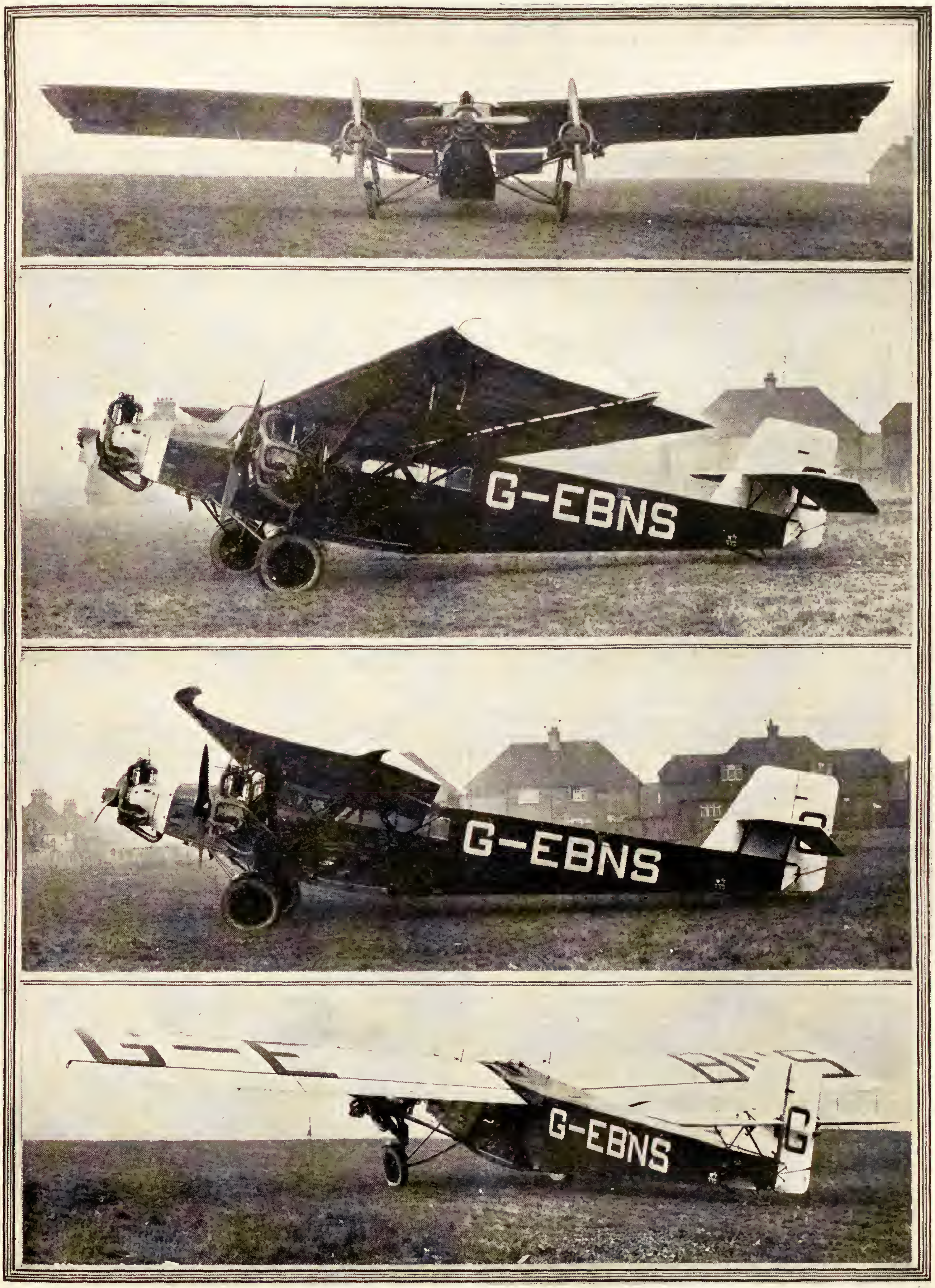


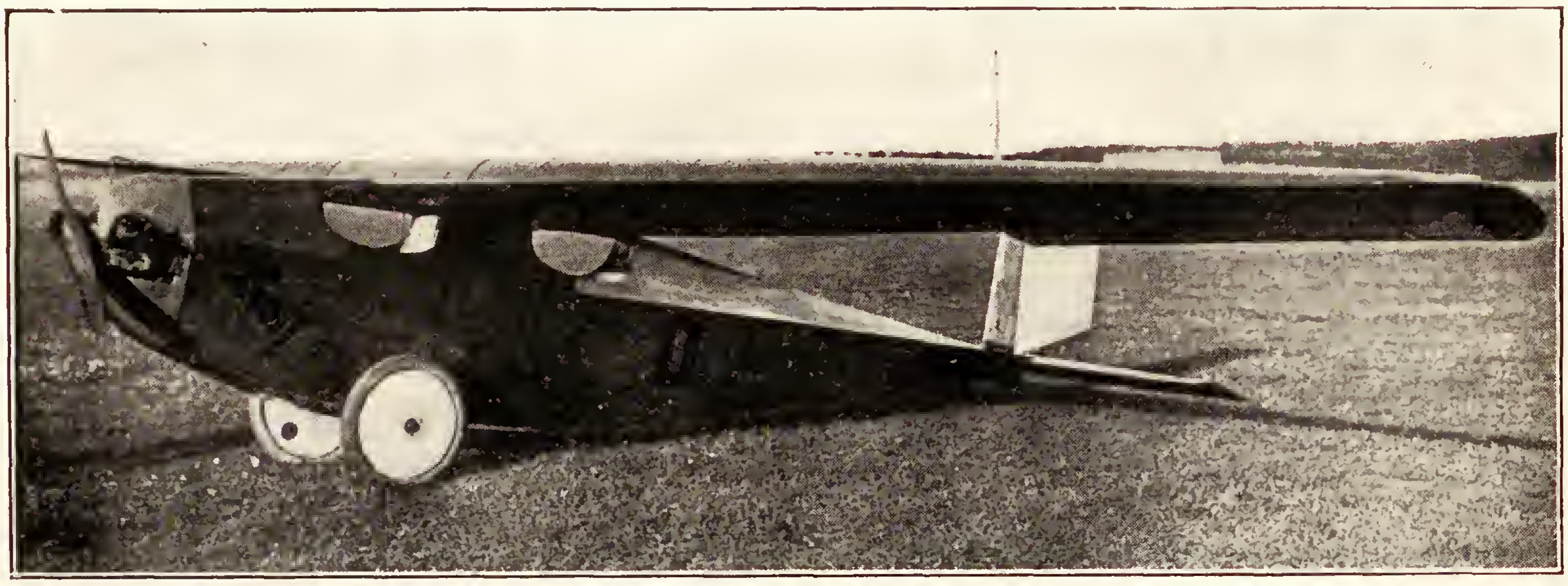
AN INTERESTING THREE-ENGINED AEROPLANE : Four views of the Handley Page " Hamlet " (three Bristol " Lucifer " engines), which was illustrated and described in detail in our issue of October 14, 1926. In the three-quarter front view the leading edge slot is closed, while in the side view it is shown open.

OVER THE ALPS WITH A BRISTOL "CHERUB" ENGINE

1,000 Miles in 14 Hours 20 Minutes and Altitude of 14,750 Ft. Reached

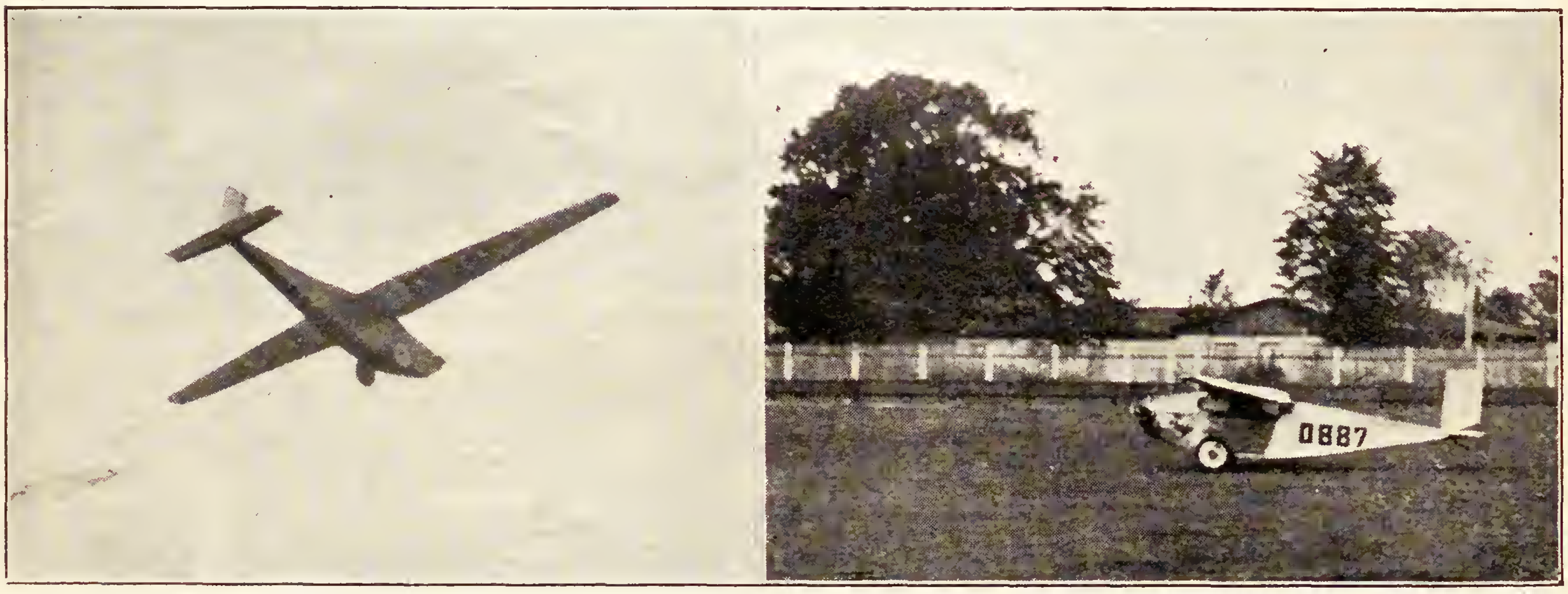
THE flight from Munich to Rome over the whole range of the Alps, recently carried out by Herr Eberhard von Conta, on a Messerschmitt Monoplane, fitted with a Bristol "Cherub" Series III engine, ranks as one of the most notable flights ever completed by a light aircraft, and is a remarkable tribute to the courage and determination of the pilot and of his passenger, Dr. Ing. von Langsdorff, the well-known German aeronautical writer.

In an account of the flight prepared by Herr Eberhard von Conta, he mentions that the first delays were encountered at Munich, owing to the fact that the official papers required from the German authorities and applied for six weeks previously were not available. However, at 9.20 a.m., on September 24, the flight was commenced.



THE MESSERSCHMITT MONOPLANE : It was on this machine, fitted with a Bristol "Cherub" engine, that Von Conta and von Langsdorff made the flight across the Alps from Munich to Rome.

"Before reaching Innsbruck," writes Herr von Conta, "I was already flying over a dense cloud bank which led me towards the chain of mountains. On reaching Innsbruck I had already attained a height of 4,000 m. (13,000 ft.), with the engine running at 2,750 r.p.m. In the Brenner Pass I had reached a height of 4,500 m. (14,750 ft.). Then unpleasant currents began to make themselves noticeable, but I flew on through snow clouds, which were travelling from west to east. Up to Franzensfeste it was possible for me to keep my course to Verona. At Brixen, however, snow and heaping clouds prevented my flying farther southwards, and I was forced to turn off by the River Drave, and over the Dolomites in Austria. After 2 hrs. 40 mins. flying, I reached Klagenfurt.



MUNICH TO ROME WITH A BRISTOL "CHERUB": On the left, the Messerschmitt monoplane in the air and, on the right, taking off.

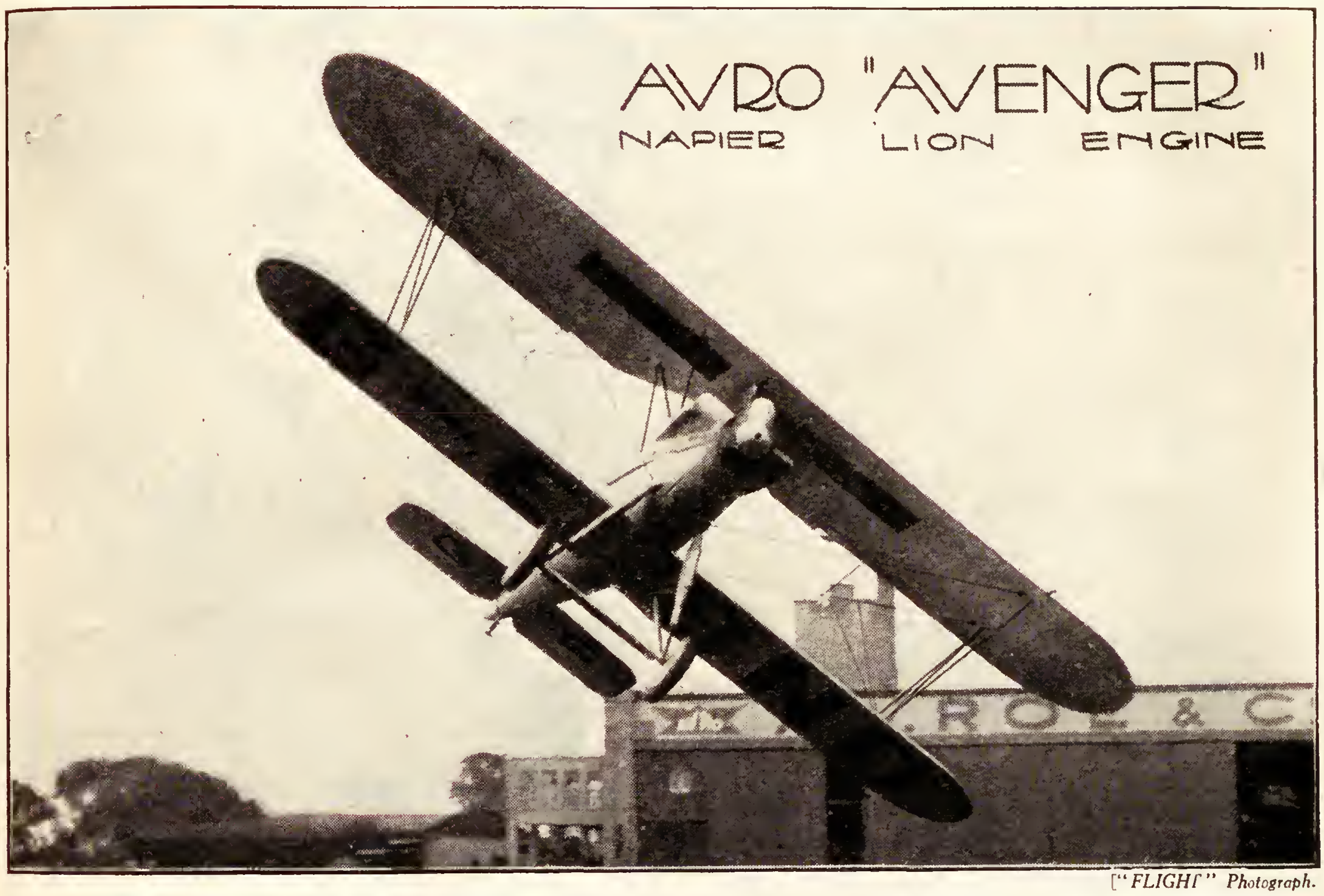
Leaving Klagenfurt I started over Villach and crossed the Karawanken mountains diagonally at 4,000 m. height towards Verona. Upon entering the Po plain, this was entirely enveloped in clouds, so that with the mountains round me at a height of 4,000 m. I wound my way 1,500 m. below their summit through the Po valley. Upon reaching the beginning of the mountains the wind had shifted and I now had a dead west wind.

"On account of the rapidly approaching darkness and the wind being against me, it was impossible for me to reach Verona, and I therefore landed the machine among the olive and the maize fields, at Susegana, 35 kms. north of Venice. The Italians kept me there until mid-day on September 25, as before I could proceed I had to await permission from the authorities at Bologna to continue my flight.

"At 1.20 p.m. I started for Padua in order to obtain some petrol. After 55 mins. I landed at Padua. It was the greatest difficulty to obtain benzol, and it was not until I had tried six chemists that I was fortunate enough to be able to obtain 3 litres. At 5.10 p.m. I again started, and after 65 mins. landed in Bologna. Here we had the same difficulty with benzol, and this was our chief difficulty throughout the flight.

"On September 26 the weather was very bad in the morning. Nevertheless, an Italian Air Force Captain flew off in the direction of Florence, but after 15 mins. he had to turn back, as the rain prevented his proceeding any farther. The

AVRO



["FLIGHT" Photograph.

:: INITIATIVE ::

OF all the numerous types of military aircraft which have recently been constructed, none pays greater tribute to the creative genius of British designers, or to the initiative and foresight of British constructors than the AVRO SINGLE SEATER FIGHTER, aptly named THE "AVENGER," which is illustrated above. This machine, which was designed and built entirely by A. V. ROE & CO., LTD., is undoubtedly one of the most striking military aeroplanes in the world.

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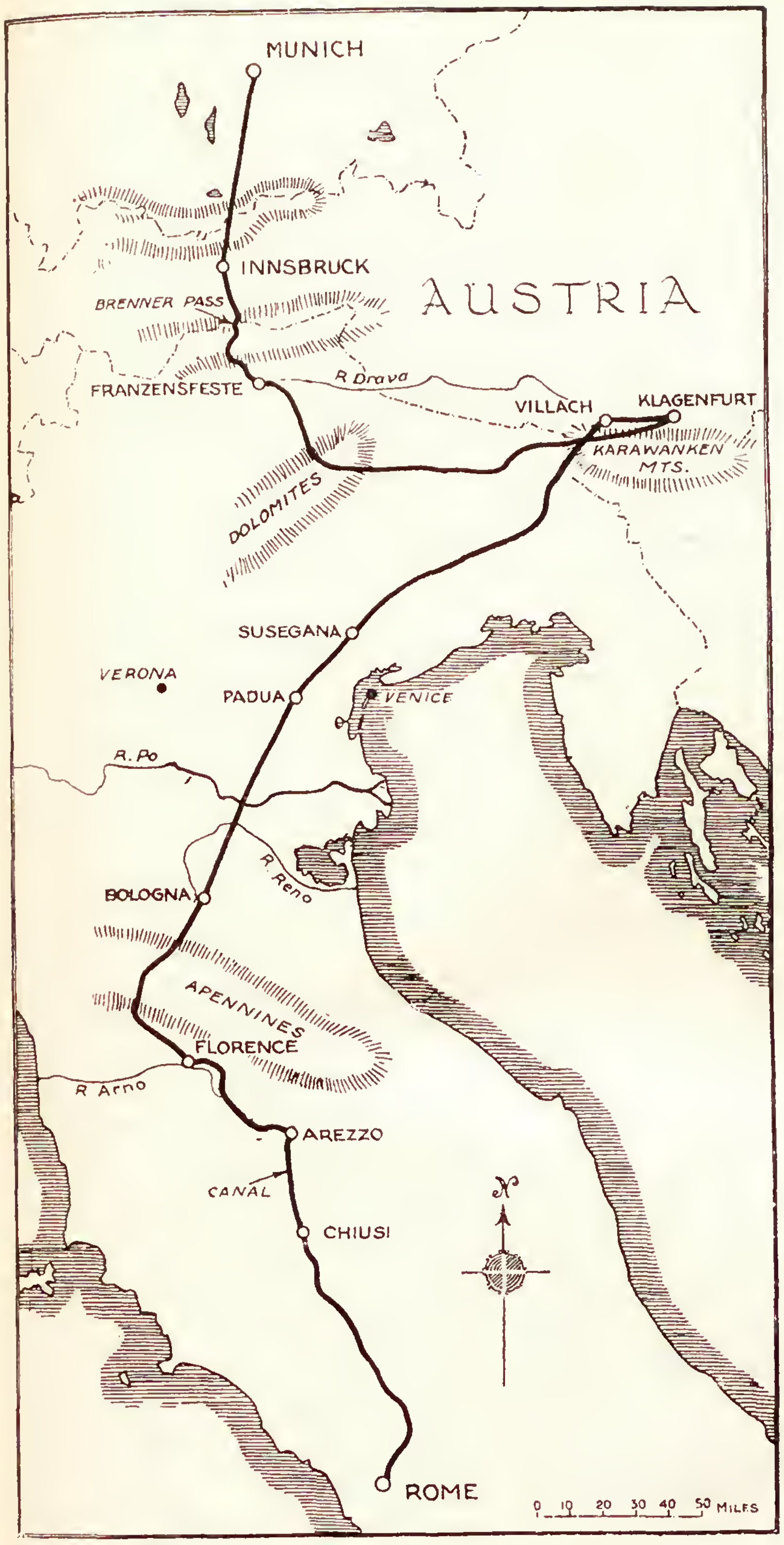

OVER THE ALPS WITH A "CHERUB": Sketch map showing the route followed by the Messerschmitt monoplane in its flight from Munich to Rome.

same afternoon I attempted to fly over the Appenines, height 2,000 m. (6,600 ft.). I flew along the Reno valley and came to the highest peaks of the Appenine range. The brewing of a heavy storm compelled me to return. The difference in times between the outward and return flight into the mountains is interesting. On the outward flight I took 48 mins., and on the return flight, including landing only 14 mins. The officers can confirm what a great hindrance the Appenine group of mountains is to flying. The air currents are much more terrible there than in any part of Germany.

"On September 27 I had to fly over the Appenines to Florence. On starting I was at a height of 2,700 m. (8,850 ft.). Further climbing was impossible owing to the endless cloud banks. Upon entering the high range of the Appenines at the same spot where days before I had been obliged to turn back, my machine was a plaything at the mercy of the winds in the valley. I was completely forced down to about 1,000 m. (3,300 ft.), and the valley was so narrow that it was impossible for me to turn, whilst the winds sweeping the sides of the valley were of such strength that on several occasions the machine was jerked 90° from its horizontal position.

"Had I not had an extraordinarily good engine, combined with the good qualities of the Messerschmitt machine, I should certainly have been dashed to pieces on the steep slopes. No words could exaggerate this incident. The official barographs are now being checked, unsealed and photographed by the authorities, and the photographs will substantiate my experience during this flight over the Appenines.

"I did not actually go to Florence, as the whole town was experiencing a heavy thunderstorm, but I flew in the rain as close to the town as I could and then I decided to fly on to a balloon station, which, however, was already known to the Italian aviators as unsuitable for landing on account of its many trenches. On landing I ran into one of these trenches, and lost my right wheel, but in three hours' time the damage was repaired. The flight from Bologna to Florence had taken 1 hr. 40 mins. The still pouring rain made me decide to wait till evening before attempting to reach the very small aerodrome which is situated in the centre of the town by the chief railway station. On September 28 still rain and storm. Next day, in spite of conditions being unchanged, I started in order to take advantage of the wind at the beginning, and I did not return to this place again. After flying in the rain for 28 mins. I first flew along the Arno valley, then along the canal between Arezzo and Chiusi. The only possible landing places were the railway lines or on either side of the river channel. Upon reaching the Tiber, the river which flows through Rome, landing places were again more numerous, and after 2 hrs. 45 mins. I landed safely at the aerodrome of Centocelle near Rome."

The arrival of the machine at Rome created the greatest possible interest amongst aeronautical enthusiasts, and Herr von Conta was invited to take part in the competition for the International Cup of Italy, which was held between October 6 and 10. It was found, however, that official participation was not possible as, according to the rules, it was only for machines with engines of from 40 to 100 h.p., and the "Cherub" did not come within this category. The Italian authorities, however, were so interested that it was arranged for the machine to take part in the 300 km. triangular flight on October 10, whilst on the previous day it was flown before the military, naval and civil authorities.

A message received from Herr von Conta from Rome states

OVER THE ALPS: This photograph shows Lieut. Eberhard von Conta, who piloted the Messerschmitt monoplane with Bristol "Cherub" engine over the Alps during the flight from Munich to Rome. On the right is seen Dr. von Langsdorff, who was Conta's passenger on the flight.

that seven machines in all started upon the 300 km. flight. Of these only four completed the course, including the "Cherub"-engined Messerschmitt machine.

The following expressions of appreciation have been received by the Bristol Aeroplane Company :—

"An opinion of your engine is not hard to give, and it can be done in a few words—your Bristol 'Cherub' Series III engine is the most reliable engine with which I have ever flown. This is not the opinion of a critic at his desk, but the opinion of an aviator who has proved your engine throughout the Appenine flight, when it was equal to all emergencies. "EBERHARD VON CONTA, (pilot)"

"It is a pleasure to me to inform you that the Bristol 'Cherub' engine behaved magnificently during this flight, and I believe that the flight, which is a world's record performance as regards height for a light two-seater and which is the first crossing of the whole range of the Alps, is one of the greatest performances accomplished with your Bristol 'Cherub' engine.

"DR. ING. V. LANGSDORFF (passenger)"

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

THE total flying time for the week was 25 hrs., 30 mins. The weather conditions were responsible for three blank days.

The following Members received flying instruction :—T. C. Sharwood, E. J. R. King, F. Clarkson, Miss Fletcher, G. Eady, M. P. Susman, H. Spooner, G. C. Bonner, J. S. Boult, L. J. C. Mitchell, G. H. S. Mills, A. J. Richardson, J. J. Hofer, N. J. S. McLeod, E. A. Lingard, J. H. Simson, J. L. Gardner.

The following Members made solo flights :—Lady Bailey, N. J. Hulbert, R. Malcolm, Miss O'Brien, E. L. O. Baddeley, O. J. Tapper, L. J. C. Mitchell, E. E. Stammers, J. H. Saffery, N. Jones, A. R. Ogston, K. V. Wright, Major K. M. Beaumont, G. H. Craig, A. G. D. Alderson, W. Hay, S. O. Bradshaw, C. A. Rogers, E. S. Brough.

The following Members had joy rides :—L. C. Davey, R. C. Presland, G. H. Craig, Miss Samuelson, Miss McKay, B. Waugh, C. G. Denton, Miss Gallien, R. E. Giffor, P. G. Lucas.

The total flying for the month of October was 183 hrs. 5 mins.

The Hampshire Aeroplane Club

OWING to the indisposition of the Publicity Secretary the usual report will not be forthcoming until next week.

Last Sunday, October 24, GEBOH was flown down to Emsworth by Mr. Musselwhite, with Mr. Perfect as passenger, in answer to Rear-Admiral Preston's kind invitation to lunch. After lunch a start was made for the Seven Sisters, with the idea of meeting Sir Alan Cobham there. As far as one can tell GEBOH was the only machine, other than Sir Alan's, which landed at Berling Gap.

Lancashire Aero Club

REPORT for week ending October 22 :—Total time for week, 25 hrs. 40 mins., made up as follows :—Dual with Messrs. Stack, Cantrill and Scholes. Messrs Twemlow 2 hrs. 20 mins. ; Blagden 2 hrs. ; Miss Brown 1hr. 20 mins. ; Messrs. Crosthwaite, 1 hr. ; Newton, 1 hr. ; Leigh, 55 mins ; Hughes, 50 mins.; Wade, 45 mins. ; Stern, 40 mins. ; Benson, 40 mins. Miss Emery, 35 mins. Messrs. Shiers, 40 mins. ; Goodyear, 35 mins. ; Woods, 25 mins. ; Gattrell, 20 mins. ; Abdalla, 20 mins. ; Cohen, 20 mins. ; Harden, 20 mins. ; Moore, 20 mins. ; Anderson, 15 mins. ; Hardy, 15 mins. ; Leeming, 15 mins. ; Fallon, 15 mins. ; Costa, 15 mins. ; Barker, 15 mins. ; Barnes, 15 mins. ; Adshead, 10 mins.

Solo.—Messrs. Costa, 2 hrs. 15 mins. ; Lacayo, 40 mins. ; Leeming, 20 mins. Williams, 30 mins. ; Goodfellow, 20 mins.

Joy-rides with Messrs. Goodfellow, Leeming and Lacayo, 2 hrs. 40 mins.

Test flights, 1 hr. 35 mins.

It is now no longer a secret that a very sporting and ambitious light plane flight is to be attempted by Mr. T. N. Stack, a member and chief instructor of the Club and Mr. Leete, another member who has represented the Club at several inter-club displays. There is no need to go into details of the long-distance flight which they are attempting on two D.H. Moths ; it is sufficient to say that the Club was so impressed with the sporting nature of the effort and its value to the light plane movement as a whole in the event of success that they took the line of giving Mr. Stack special leave of absence from his duties at a few days' notice in order to enable him to carry out the flight. We wish them both all possible good fortune and success and (like the mothers of the American world fliers) we have "sent them away with a smile and will welcome them home with beers."

The Club has been exceedingly fortunate in obtaining at short notice as Mr. Stack's deputy the well-known pilot, Mr. H. A. Brown. After a distinguished record in the R.N.A.S. and R.A.F., Mr. Brown was the leading pilot of the Avro joy-ride company in the years immediately following the war. For the last five years he has been the chief instructor at Barcelona and has a record of over 3,000 hours' flying.

Midland Aero Club, Ltd.

REPORT for week ending October 23.—The total flying time was 6 hrs. 28 mins. The following members were given dual instruction : S. H. Smith, A. B. Gibbons, C. Fellowes, H. Smith.

The following members made solo flights : H. J. Willis, W. Swann, R. L. Jackson, E. J. Brighton, J. Brinton, C. L. Knox.

The club moved into their new premises during the week, as the Hangar previously used is now in the occupation of the R.A.F.

Bad weather has again restricted flying.

REPORT for week ending October 31.—The total flying time was 8 hrs. 30 mins.

The following members had dual instruction :—A. B. Gibbons, H. Smith, C. Fellowes, C. L. Knox.

The following members made solo flights :—E. J. Brighton, W. Swann, C. L. Knox, R. L. Jackson. Mr. L. V. Mann was given a passenger flight.

Very little flying was possible on Sunday last owing to bad weather.

Newcastle-upon-Tyne Aero Club, Ltd.

REPORT for week ending, October 24,—Total flying time, 24 hrs. 45 mins. Dual with Mr. Parkinson, 19 hrs. 20 mins., solo 5 hrs. 25 mins. ; tests 10 mins.

The following members flew under instructiin :—Miss C. R. Leathart, Messrs. J. M. Kennedy, H. Ellis, J. D. Irving, D. Matthews, R. Stawart, M. Bainbridge, T. E. M. Wardill, F. L. Turnbull, R. Miesegaes, C. E. Craig A. D. Bruce, R. Whitfield, and J. N. Charlton.

The following members flew solo :—Mr. H. Ellis, Mr. J. D. Irving, Lord Ossulston with Mr. Heppell and Mr. D. Matthews as passengers. Mr. F. H. Phillips with Mr. Weeks. Dr. H. L. B. Dixon with Miss Howard, and Mr. Phillips. Mr. R. N. Thompson with Mr. H. Ellis. Mr. C. Thompson Junr., with Mr. Osborn. Mr. W. Baxter Ellis with Mr. H. Ellis.

Mr. J. D. Irving went solo on the 21st, putting up an excellent flight and landing.

FLYING report for week ending October 31.—Total flying time, 15 hrs. 30 mins., all on LX ; LY is awaiting the completion of top overhaul of engine. Dual, 6 hrs. 5 mins. Solo, 9 hrs. 25 mins .

The following Members flew under instruction with Mr. Parkinson :—Miss Leathart, Mr. C. E. Craig, Mr. C. E. Shaw, Mr. D. Matthews, Mr. R. Whitfield.

The following Pilot Members flew with passengers :—Lord Ossulston, with the Earl of Tankerville, Mr. Matthews, Mr. Atkinson, and Mr. Turnbull.

Mr. Forsyth Heppell, with Mr. Wardill, Mr. H. Ellis, Mr. Stawart.

Mr. R. N. Thompson with Miss Leathart, Mrs. Marcks and Mr. Watts (Mr. Thompson is always sure of anyone he asks to go as passenger with him ; he is regarded as the safe and steady pilot, who will not do tricks).

Mr. W. Baxter Ellis with Mrs. Ellis, Miss Nesbit, Mr. Douglas, and Mr. Nicholson.

Mr. C. Thompson, with Mr. Watts and Miss James.

Dr. H. L. B. Dixon, with Mr. Dixon, Mr. Whitfield, Mr. Henderson and Mr. L. Wilkinson.

Mr. F. H. Phillips with Mr. Annandale, and Mr. J. Bell.

Miss Leathart, Mr. H. Ellis and Mr. Matthews flew solo during the week, Miss Leathart being "launched" on Monday morning and Mr. Matthews in the afternoon.

On Monday, in spite of very bad weather conditions and a considerable quantity of snow, Lord Ossulston travelled by car to the Aerodrome from Chillingham Castle, some 40 miles, with the Earl of Tankerville, his father, as passenger, and then flew with him back to Chillingham, landing there and returning to the Aerodrome solo.

The Earl of Tankerville is 75 years of age, and made the flight very largely with the object of showing his confidence in flying, as he considers, as the Club has usually felt, that such flights do much good.

Mr. Parkinson is taking a month's rest, so the Pilot Members will now make up for lost time, as there will always be one machine available for them. It will be noted that they have started well this week. There was a good attendance on Saturday and Sunday.

Dr. Dixon has very kindly loaned a piano to the Club, and now that flying finishes early, some happy evenings are spent in the Club house. Another valuable aid to comfort is the gift of a portable stove by Lord Ossulston, for which certain members of the staff are very grateful.

The Yorkshire Aeroplane Club, Ltd.

REPORT for week ending October 29.—Total flying time, 12 hrs. 5 mins., made up as follows : Dual instruction, 11 hrs. 15 mins. ; solo, 30 mins. ; Tests, 10 mins. ; Joy-rides, 10 mins.

The following flew solo :—Messrs. Dawson and Wood. Captain West gave dual instruction to the following Members :—Messrs. Dawson (L.S.) Gratwick, Harvey, Mann, Oglesby, Pigg, Watson, Wilson, Winn, Capt. Beaumont, and Miss Woodhead.

The weather has been poor (but honest) for most of the week, with fog in the morning and half-a-gale in the afternoon. These conditions evidently affect the solo time more than the dual ; in these circumstances, we have initiated a research to demonstrate the coincidence of solo time with sunlight.

This week we succoured an orphan of the storm, when a Hyderabad from Bircham Newton arrived with an inch of snow on the top plane. He stayed with us one night, paid his shot like a man, and went away again next morning. We are eagerly waiting for his next visit, after which we shall commence negotiations for the purchase of our hangar.

Mr. Rimmer is still with us, waiting with commendable patience for a fine day to complete his work for Messrs. Aerofilms.

We have no less than five pupils ready to go solo, but have been unable to launch them in this weather. Mr. Watson grew tired of waiting, and set off with Captain West to find Harrogate ; an Odyssey which will prove historic in the annals of the Club. Having passed vertically above it, he proceeded to look for it at Knaresborough, Boroughbridge, Malton, Pocklington and York, only desisting with the sunset.

The engine in G-EBNN has been down for a top overhaul. Our new cylinder heads have phosphor-bronze valve seatings.

Rumour has it that when the production "Bluebird" appears, it will be found that she has suffered a sea change (at Brough) into something not quite so rich and strange. The tail skid will, however, remain unaltered.

We are asked to contradict our statement of last week that two members had bought a pig (less engine) in a poke. This is indignantly denied : the pig was *given* to them.

Accident to French Aircraft, F-AIEB

THE Air Ministry announces :—As a result of the investigation into the circumstances of the accident to the French Aircraft F-AIEB, which occurred near Dymchurch on 18th August last, the Inspector of Accidents has arrived at the following conclusions :—

(1) That the aircraft came into collision with the roof of a farm building when the pilot was manoeuvring to land.

(2) That the collision was due to an error of judgment on the part of the pilot.

(3) That no defect developed in the aircraft or any of the engines during the flight and that the pilot was attempting to land on account of the bad weather conditions which prevailed at the time.

Royal Aero Club Monthly House Dinner

THE monthly house dinner will be held at the Club on Wednesday, November 10, 1926, at 7 o'clock. Mr. F. Handley Page will open a discussion on "British Aviation," and the chair will be taken by Lord Thomson.

The following successful flights have been accomplished with Napier Lion engines in 1926:

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Cairo to Aden and back by two Royal Air Force Vickers' machines - - -	18,000
Spain to Buenos Aires by a Dornier Wal flying boat piloted by Major Franco -	12,518
Total engine flying miles -	113,518

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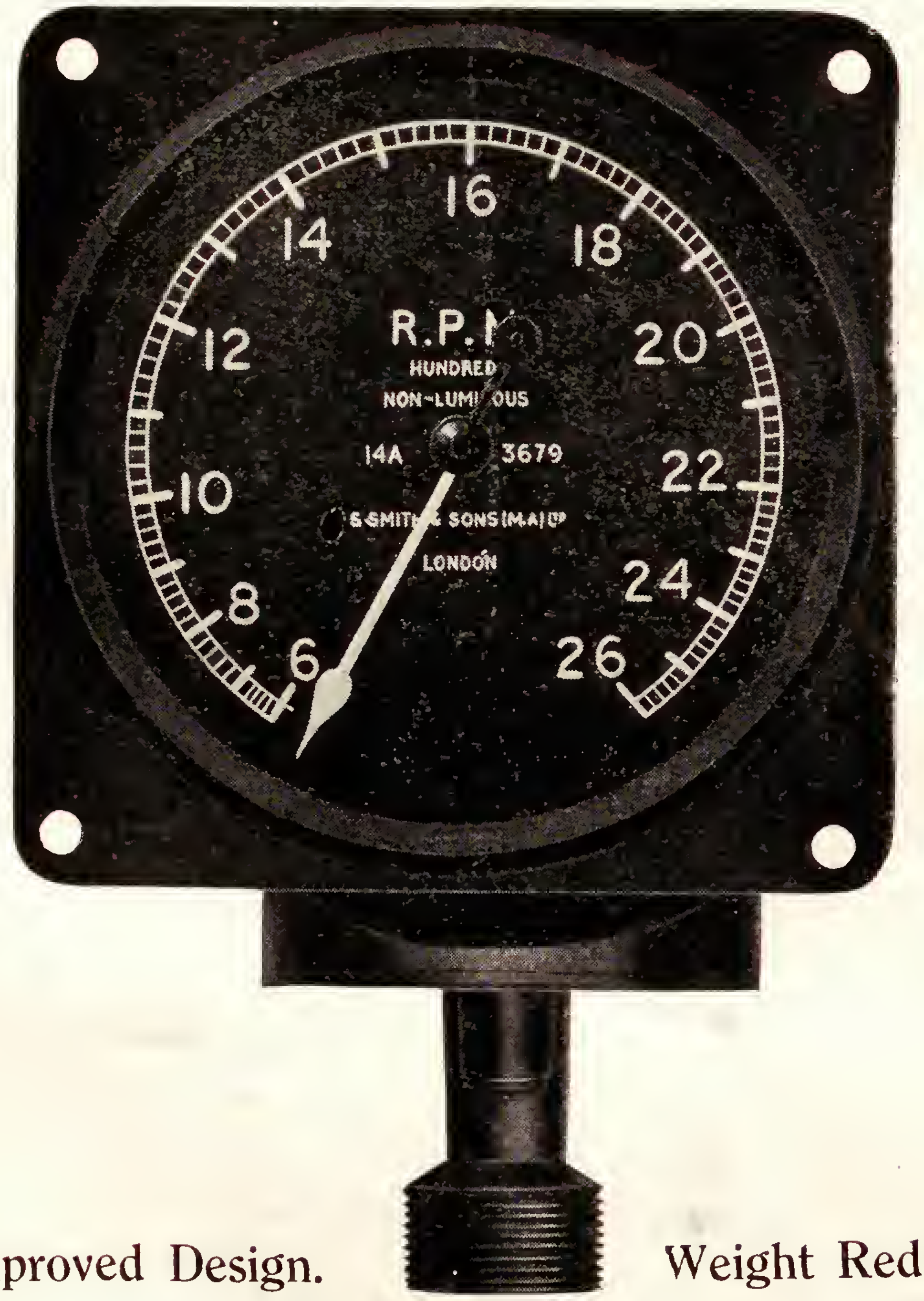

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THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

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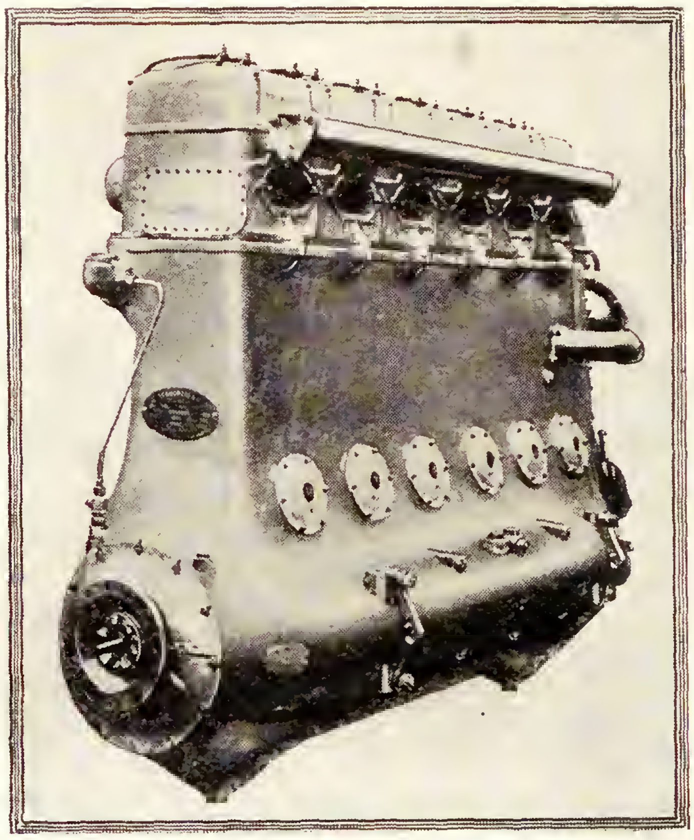
THE BEARDMORE "CYCLONE" AERO ENGINE

900 H.P. at 1,350 R.P.M.

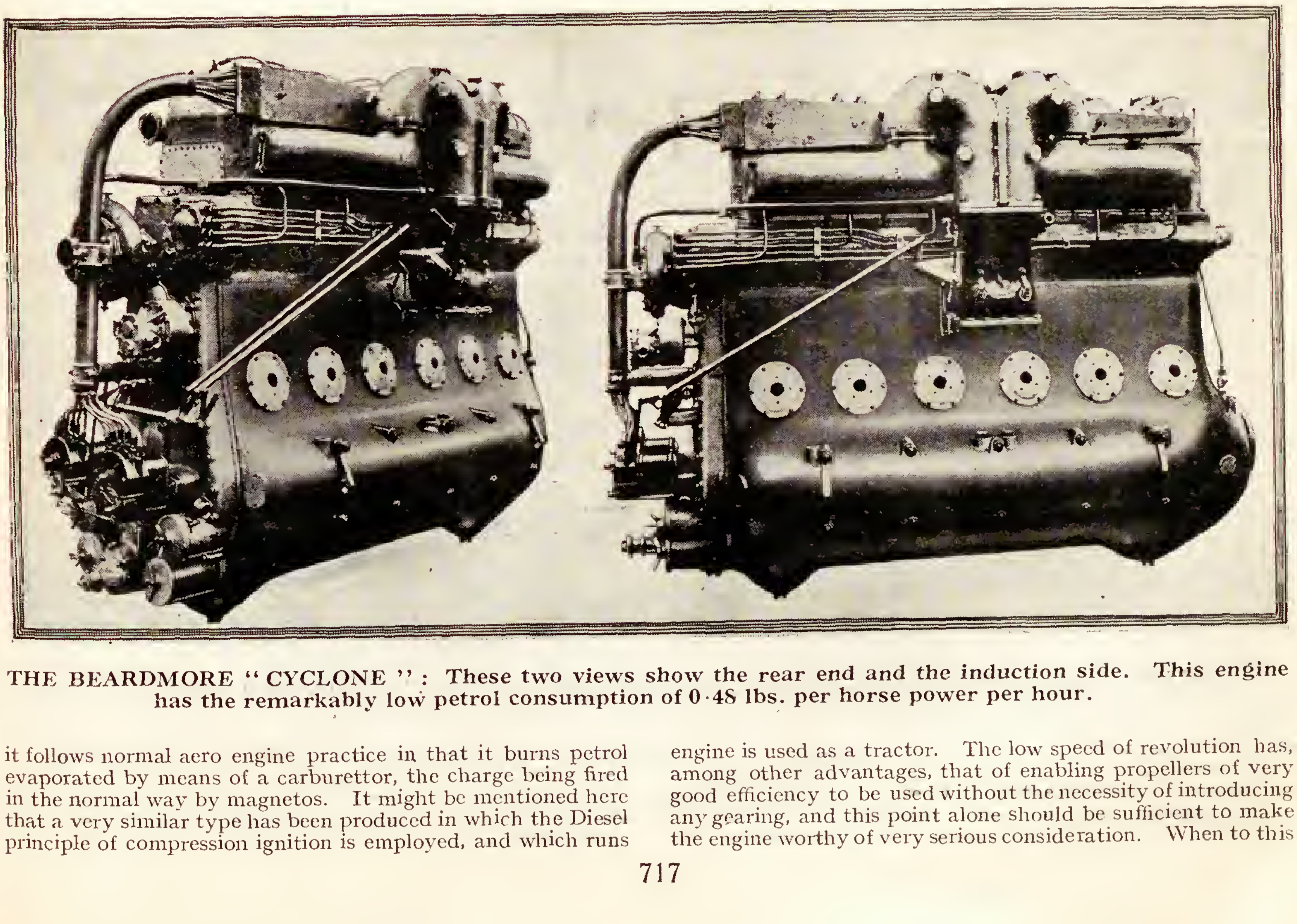
From time to time during the last three or four years, rumour has been busy with engines of the heavy-oil type working on what is frequently described as the "semi-Diesel principle," and it has become known that experiments and research is going on with a view to developing this type for use in aircraft, the main advantage advanced for its adoption being the reduced fire risk which the use of heavy oil in place of petrol might be expected to bring with it. Among the firms who are rumoured to be working on the problem is that of Wm. Beardmore & Co., Ltd., who are believed to have made very good progress in this direction. However that may be, this firm has also been doing a great deal of research work along rather different lines, and as a result have produced aero engines of a type differing very considerably from any hitherto used in aircraft. Among these mention may be made of the "Cyclone" a six-cylinder "in-line" engine, which recently underwent its tests at the Parkhead, Glasgow, works of Beardmore's.

Detailed particulars of this engine may not be published at the moment, but it will be realised that the engine can be said to have reached a practical stage in its development when we say that it develops some 900 h.p. at the very low speed of 1,350 r.p.m., and that for this power the weight is only 2,150 lbs. "dry," a weight-power ratio of 2·4 lbs./h.p.

As the accompanying photographs will show, the "Cyclone" is somewhat similar in external appearance to a semi-Diesel engine, with its tall cylinders and deep crankcase, although it follows normal aero engine practice in that it burns petrol evaporated by means of a carburettor, the charge being fired in the normal way by magnetos. It might be mentioned here that a very similar type has been produced in which the Diesel principle of compression ignition is employed, and which runs on crude oil. Another engine similar to the "Cyclone," except for the fact that it is of the inverted type, *i.e.*, so mounted that the cylinders project downwards from the crankcase, is the "Typhoon," which also runs on petrol.



The Beardmore "Cyclone" viewed from the propeller end. The normal power is about 900 h.p. at the remarkably low speed of 1,350 r.p.m.



THE BEARDMORE "CYCLONE": These two views show the rear end and the induction side. This engine has the remarkably low petrol consumption of 0·48 lbs. per horse power per hour.

We gather that on completion of its test runs the Beardmore "Cyclone" is being sent abroad. It may be recollected that Beardmore semi-Diesel engines have been supplied to the Canadian National Railway for locomotives, and now it looks as if another Beardmore product were going out of the country for its first practical tests. We have not been able to ascertain definitely where the "Cyclone" is going, but "The Continent" is rumoured to be its destination.

As we have already mentioned, it is not possible at the moment to give details of the construction of the Beardmore "Cyclone," but the following brief particulars may be of interest. The engine has a bore of 8⅝ in. and a stroke of 12 in., and runs at a normal speed of 1,350 r.p.m. According to whether small or large carburettors are fitted, the Mark II "Cyclone" develops 850 h.p. and 950 h.p. That the engine is by no means of the Diesel type will be clear from the fact that the compression ratio is only 5·25 to 1, by no means a high figure.

Ignition is by two magnetos, the type fitted as standard being the Watford C.6 S.M., the mounting of which can be seen in the photographs. Another view shows the propeller boss, the airscrew being direct-driven and the direction of rotation being left-hand when the engine is used as a tractor. The low speed of revolution has, among other advantages, that of enabling propellers of very good efficiency to be used without the necessity of introducing any gearing, and this point alone should be sufficient to make the engine worthy of very serious consideration. When to this is added the fact that the engine is of quite reasonably low specific weight (*i.e.*, less than 2½ lbs./h.p.), and that the fuel consumption is remarkably low, it will be seen that for flights of long duration at any rate the "Cyclone" should be a very economical proposition. The figure for fuel consumption supplied by the manufacturers is as low as 0·48 lb./h.p./h. and the oil consumption 0·1 lb./h.p./h. Taking round figures the total consumption (based presumably on full-throttle running) is one-half pound per horsepower per hour, or at the maximum power of 950 h.p. 475 lbs./hr. Thus the weight of engine plus the fuel it consumes in one hour is 2,625 lbs., but for 10 hrs. the figure is only 6,900 lbs., which is remarkably low for an engine developing 950 h.p.

The main outside dimensions are as follows:—Length, 80·3 in.; width, 35 in.; height above centre line of crankshaft, 46 in.; height below centre line of crankshaft 15·125 in. The small frontal area is another point in favour of this engine. Incidentally, it should be pointed out that the weight of 2,150 lbs. does not include the weight of the radiator, which is not supplied by the makers, nor does it include the airscrew hub.

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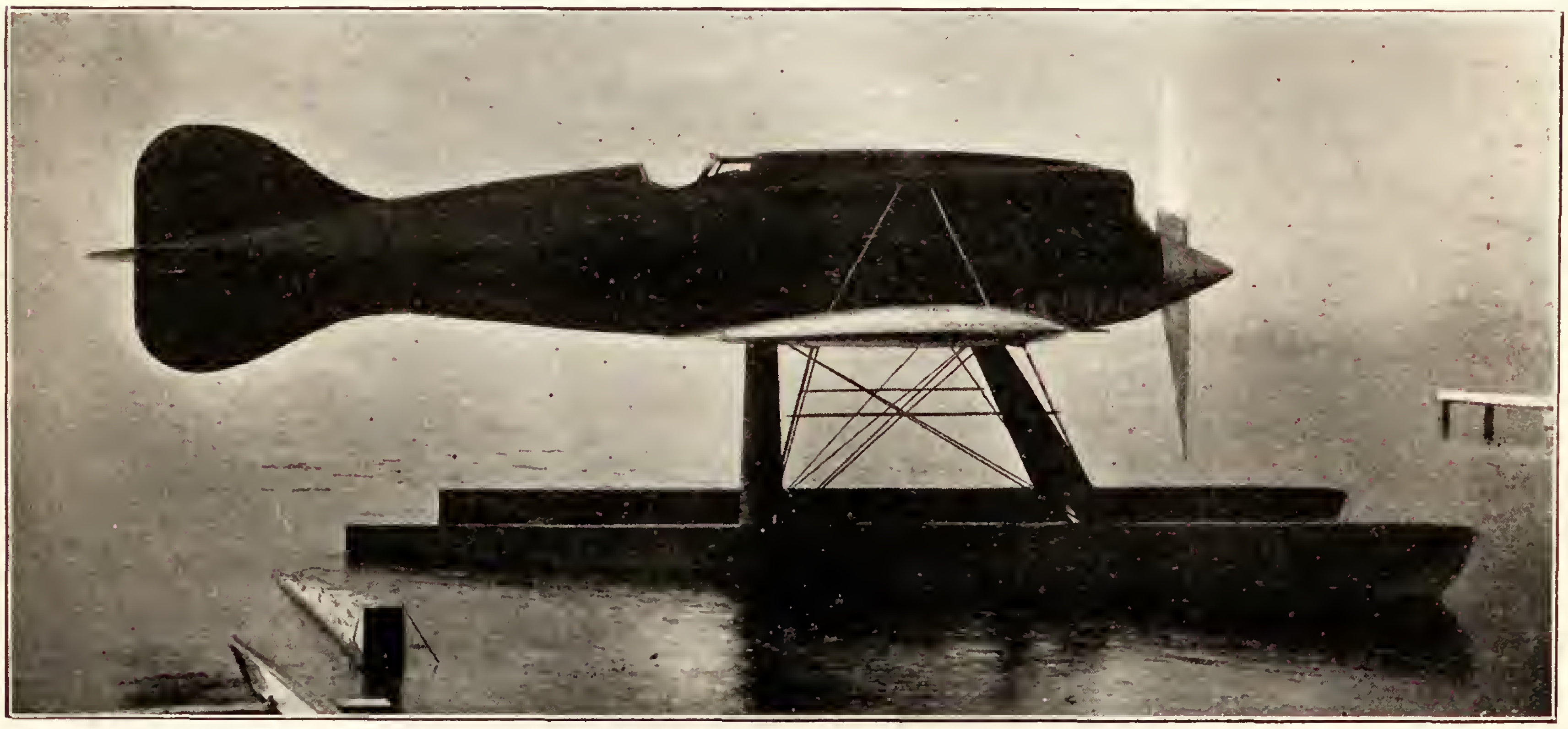
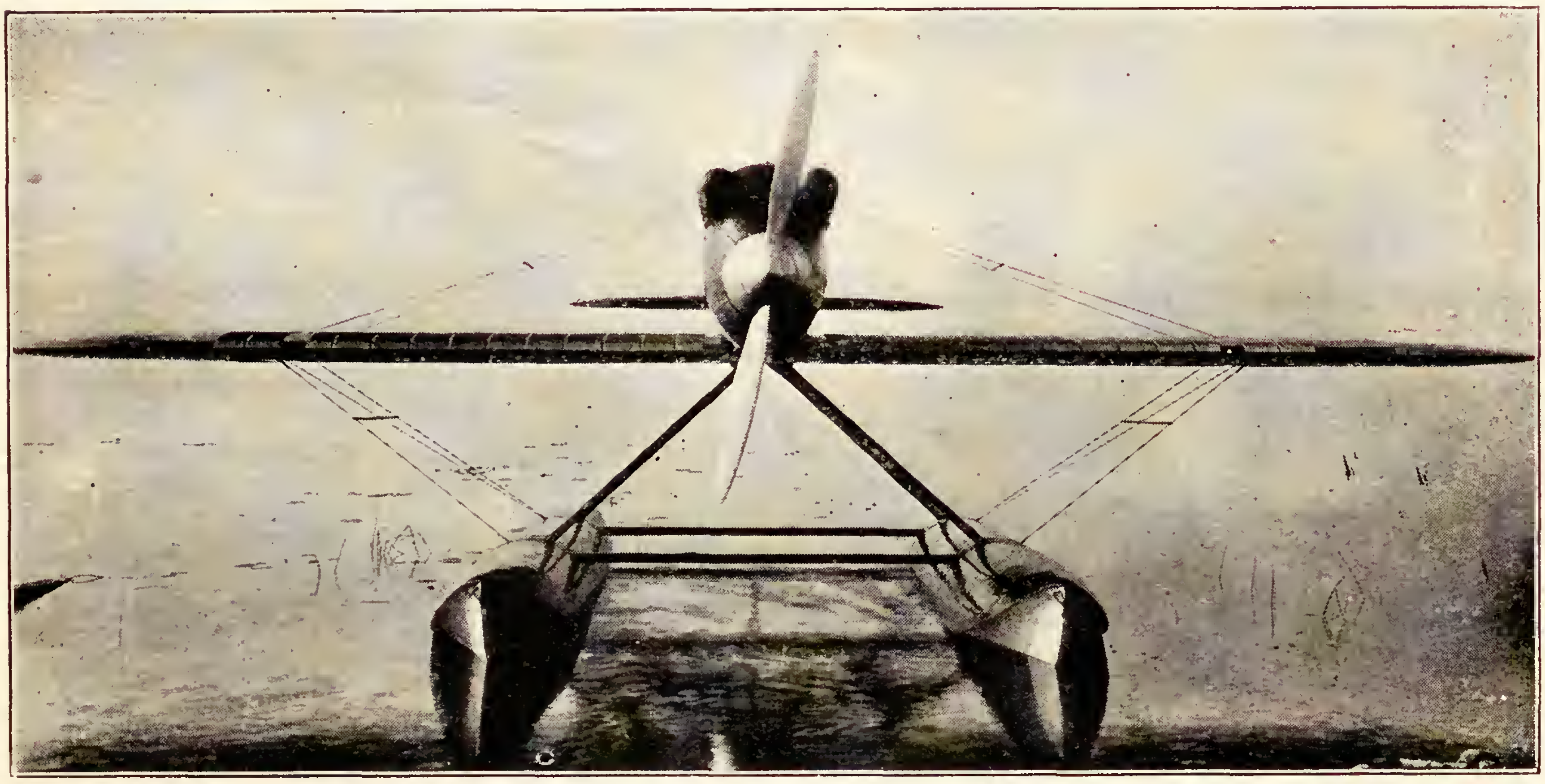


STREAMLINING: A side view of the Macchi M.39 low-wing monoplane built for the Schneider Cup Race. The external wing bracing forms a letter N as regards the left bracing, while the landing wires are in the form of a letter A, the cross-stroke being formed by a short horizontal steadying strut or distance piece. The proportion of fixed vertical fin area to rudder area is large. The engine is a Fiat.

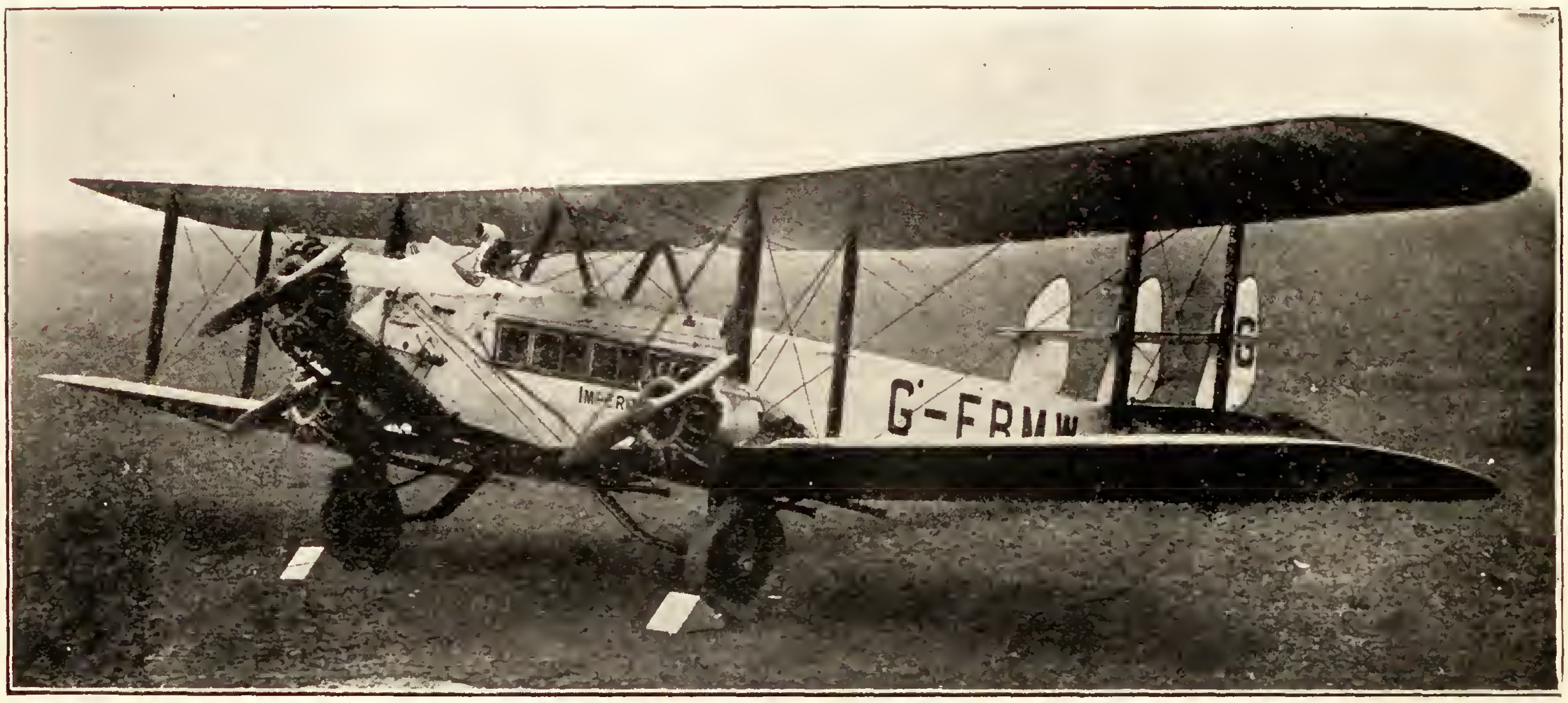


A CHALLENGER: This front view shows the Macchi M.39 Monoplane, with Fiat engine, designed and constructed for the forthcoming Schneider Cup Race in Virginia. That the lines are clean there can be no gainsaying. The fuselage is of small cross-sectional area, the wing bracing is a minimum, and the radiators are of the wing surface type. The machine has "speed" written all over it. Whether it will be able to defeat the American defenders remains to be seen.

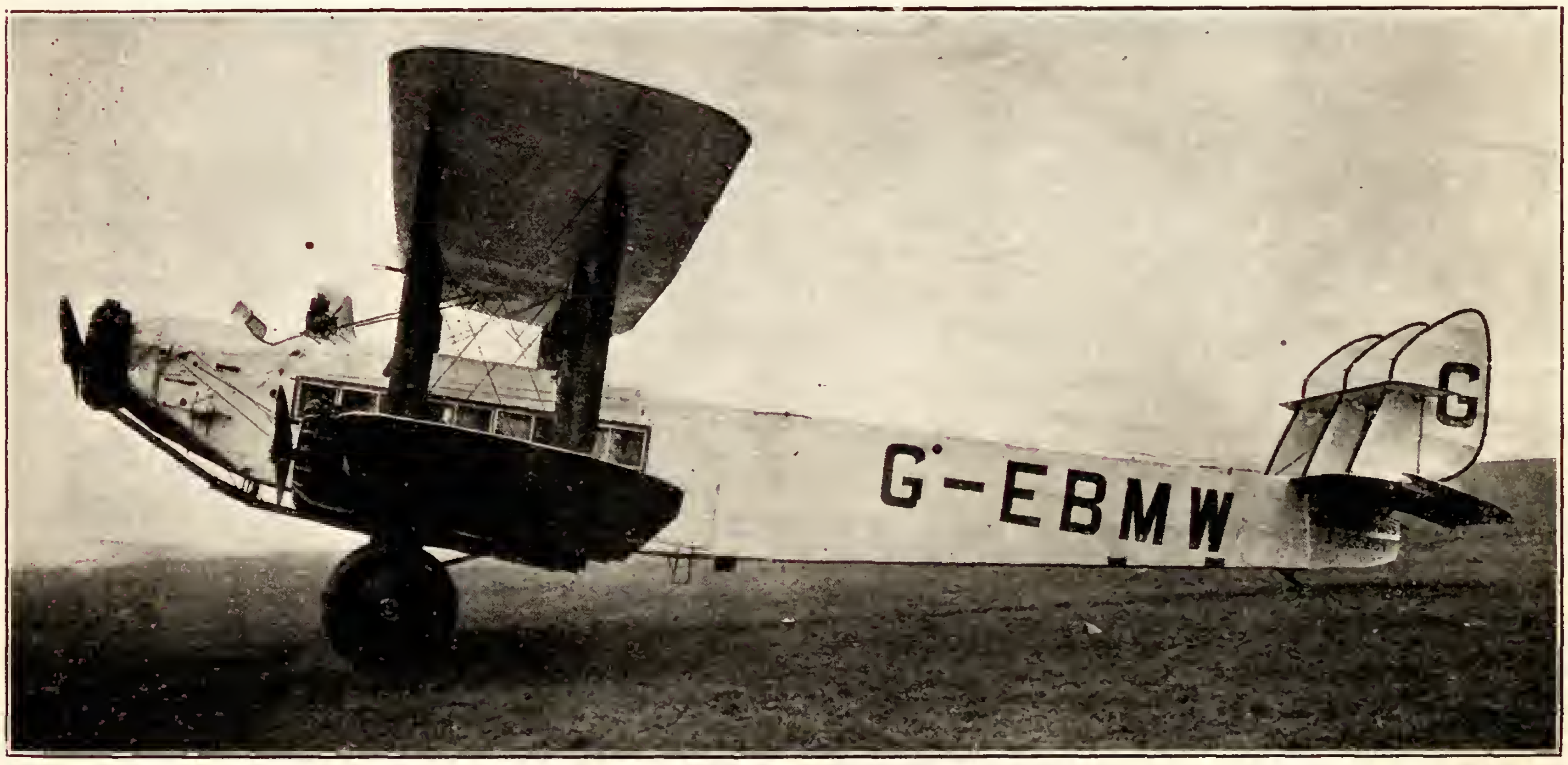
A NEW MACHINE FOR EMPIRE AVIATION

The D.H. 66 "Hercules," three Bristol "Jupiter VI" Engines

IN our issue of July 10, 1926, we published a detailed description, general arrangement drawings, and sketches of constructional details of the de Havilland "Hercules" designed for the Cairo-Karachi air route which is to be opened next year. The first of these machines was inspected by a number of press representatives and others yesterday at the Stag Lane Aerodrome of the de Havilland Aircraft Co. The machine looks remarkably "clean" for a large three-engined passenger carrier, and its power surplus is such that not only is it capable of flying or even climbing on any two of its three engines, but it has a high cruising speed and a very good top speed so as to be able to combat such strong head winds as must be counted with over the desert air route. As long distances will probably have to be covered without landing, the petrol capacity is high (300 gallons), which naturally means a corresponding reduction in paying load. Reliability and good performance are the features aimed at rather than extreme economy, and in any case the day has gone when it is fair to judge a machine merely upon the paying load per horse-power which it will carry. So many other factors have to be taken into account that using this basis as a criterion conveys nothing.



THE DE HAVILLAND 66 "HERCULES": Fitted with three Bristol "Jupiter VI" engines this type of machine is intended for the Cairo-Karachi air route which is to come into operation early in 1927. The Secretary of State for Air, Sir Samuel Hoare, who will be accompanied by Lady Maud Hoare, will be one of the passengers in the first machine to fly out to the East. A detailed description, with general arrangement drawings and sketches of constructional details, was published in our issue of June 10, 1926.



THE DE HAVILLAND 66 "HERCULES": Side View. Note the three rudders and the biplane tail. The protruberance aft of the pilot's cockpit is the fresh-air intake for the cabin. Mounted next to it is the Bristol engine starter by means of which the three main Bristol "Jupiter" engines are started.

IMPERIAL AIR COMMUNICATIONS

Sir Samuel Hoare's Speech at the Imperial Conference

On the occasion of the tenth meeting of the Imperial Conference held at No. 10, Downing Street, on October 28, Mr. Baldwin presiding, the Secretary of State for Air, Sir Samuel Hoare, opened an important discussion on Imperial Air Communications, in which the Prime Ministers of Australia, Canada, New Zealand, and Newfoundland, and Mr. Havenga (South Africa), Mr. McGilligan (Irish Free State) and others took part.

Unfortunately, we have not the space available to give the Air Minister's address in full, and can only give a general outline of his speech, with extracts dealing with the more important points.

In his opening remarks, Sir Samuel said he proposed to deal with this subject from the Civil as distinct from the Military point of view, although he pointed out that the civil and military aspects were inextricably connected, and that the development of Imperial airlines—aeroplane or airship—were a vital factor in the problem of Empire Defence.

There were at the start, he said, two broad propositions—firstly, the Empire was in urgent need of better communications; secondly, if these were to be improved, a sustained and united effort would be required.

We had now, he proceeded, reached a most important turning point in the development of airways and air communications, and if we looked back over the 23 years of flight—or only as far back as the last Conference of 1923—one must be struck by the speed and the extent of the progress that had already been made. Wider and wider use was being made of civilian air transport, and technical improvement had been made with machines, engines, wireless, and meteorology. As regards safety, what better record could there be than the five million miles flown by British services for four fatal accidents, and the million miles flown in Australia for a single accident?

These results, continued Sir Samuel, seemed to him to show that after years of research and experiment and adventure we had reached a definite stage in the development of flying, from which we could in the near future make progress altogether out of proportion to anything that had been achieved during the last few years. There was to-day no technical or operational reason why by aeroplane or airship London should not be brought within a fortnight of the farthest cities and territories of the Empire.

He proposed, therefore, to suggest to the Conference different ways in which we could make fuller use of this new instrument in the near future. He would deal chiefly with the British routes and policy because he was for the moment taking London as the terminus of the principal Empire air routes.

Hitherto, whilst certain European services had been safely and punctually operated for several years, there had been no civil air services plying between one part of the Empire and another. In the Middle East an air route between Egypt and Iraq had been regularly flown by military machines carrying mails and official passengers for five years, and it was now proposed to substitute in its place a regular civil line for the carriage of freight and passengers, not only between Cairo and Baghdad, but between Cairo and Karachi. Sir Samuel then gave details of this service, references to which have already been made in Flight.

Would it be possible, added Sir Samuel, for the Government of India to consider the question of extending the service across India from Karāchi to Bombay or Calcutta? And similarly, for the Government of Burma to carry it a stage farther, to Rangoon? It might then be practicable to link with the civil line experimental flights of the R.A.F. flying boats that it is intended to station in the Far East, and again with the occasional service flights of the R.A.A.F. from Australia? If in the not remote future links could be inserted in some such way, a long chain of great tensile power would be forged across the Empire's framework.

So also with Africa. Just as there must be an Empire Air route to the Far East stretching to Australia and New Zealand, so there must be an Empire air route from London to the Cape with branches diverging to the West African Dependencies. Here again a beginning was being made during the next few months. An enterprising pioneer, with the help of the Governments of Kenya, Uganda and the Sudan, had organised an experimental service covering 1,400 miles between Khartoum and Kisumu. As the route followed the course of the White Nile the machines would be hydroplanes. If this service was successful, from 10 days to a fortnight would be saved in the journey between Khartoum and Uganda, and eight days between Khartoum and East Africa.

Why, therefore, should not the Northern and Southern links be forged in this African chain, and a through aeroplane service run at least experimentally between Egypt and Cape Town? The R.A.F. was prepared to arrange for a certain number of flights, in the course of the training programme, carrying mails and official passengers, linking up with the civil machines at Khartoum. Could not the S.A.A.F. make a certain number of flights linking up with the route at Uganda?

It would be seen, proceeded Sir Samuel, that he was proposing for their consideration the creation of these two long-distance air routes on a "mosaic plan." We were all too hard up for anyone to undertake the heavy cost of an air route to Singapore or Cape Town, and he had suggested a way, by each inserting their particular stone in the design, in which this might be accomplished. Once the pioneer services started, the formation of regular civil lines would follow.

Sir Samuel said he wished to draw attention to another very important field where the co-operation of Dominion Governments was needed, and that was the provision of landing grounds at proper intervals. Would the Governments of the Empire take their share in providing suitable landing grounds upon the great Empire routes, and keeping them in order?

Sir Samuel then passed on to the question of Empire airship routes, upon which subject he dealt very fully. It might be asked, he said, why should the Empire require both airship and aeroplane, and how could airships ever be immune from the catastrophies that destroyed the R.38, the "Dixmude," and the "Shenandoah"? As to the first, airships would carry out the long-distance non-stop air journeys of the future. The two airships that were being built should, with a normal load of freight and 100 passengers, be able to fly without refuelling in good weather a distance of some 4,000 miles, and being of great size, and practically silent, would be much more comfortable.

The aeroplane and the airship were really complementary to each other, and it was necessary, in his view, to organise both aeroplane and airship lines.

"Then," continued Sir Samuel, "there is the objection, and a very serious objection, raised on the ground of danger. There is the danger inherent in so large and fragile a structure; there is the danger of storms of unexpected and incredible ferocity; there is the danger of conflagration in a ship composed of highly-inflammable material. How can dangers such as these be ever surmounted? I would like the Conference or the Committee to examine my experts as fully as possible upon all these points. I need not tell you that, being a very cautious person myself, I have examined them again and again upon them. They and I are very far from being reckless optimists. Indeed, our attitude towards this great problem has been well described by a well-known Cambridge scientist as an attitude of 'healthy cold feet.' What I would say without fear of contradiction is that great progress has been made both on the theoretical and practical side during the last two years, and that we can claim to have made the fullest possible use of scientific theory, of full-scale and model experiment, of the testing of materials, and, by no means least important, of the study of meteorology. We believe that he have discovered many of the weaknesses and surmounted many of the difficulties that occasioned the failures in the past."

After referring to certain structural features of the two new airships, and to the meteorological aspect of the case, Sir Samuel pointed out, in regard to the danger of fire, that the airship being built at Cardington would be equipped, not with petrol, but with heavy-oil engines, which showed a great advance in the way of safety, particularly in the case of airships operating in tropical climates.

In all these directions, then, proceeded Sir Samuel, they had made a serious and scientific effort to avail themselves of the lessons of the past, and to avoid the dangers that had hitherto been so formidable. Slowly but surely our programme had been developing, and in a year's time the two great airships should be completed. It was then proposed to carry out adequate home trials and subsequently to fly at least one of the airships regularly to and from India for a full period of trial in tropical conditions. When these trials were completed, it was hoped, if the Dominions so desired, to make

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"MOTHS" are built in the same factory and the same methods are employed in their construction, as in the D.H.50, which Sir Alan Cobham has flown over 100,000 miles on Empire flights.

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The "MOTH," with its wings folded can be housed in a building no bigger than an average garage—Illustration No. 1 shows a "MOTH" in one of the "lock-ups" at Stag Lane Aerodrome, which are let at a rent of £1 per week, including garage services, such as washing, handling on the ground, etc.

2. Spreading the wings for flight and folding them for housing or towing behind a light Car are operations which can be carried out by the MOTH-OWNER in a minute or so. The mechanism is perfectly simple and foolproof.

3. The petrol tank holds sufficient fuel for journeys up to 250 miles and there is ample room for luggage, golf clubs and other gear—remember, the "MOTH" has been designed as a real utility vehicle.

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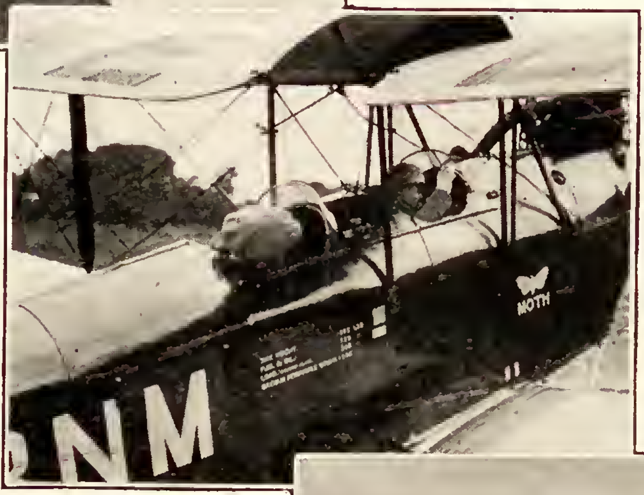

[*"Flight" Photos.*]

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demonstration flights to the capitals of the Empire. If these demonstration flights were to take place to Australia and New Zealand, to Canada and South Africa, the co-operation of the Dominion Governments was essential. We could not fly the two airships to the Dominions even for demonstration flights unless two conditions were satisfied. Firstly, there must be mooring masts to which the airships could be attached at the end of their journey. Secondly, there must be meteorological data upon which the choice of dates for the flight could be based, and a meteorological organisation for keeping the airship supplied with the necessary weather intelligence. These two conditions were vital to the programme, and, what was more, they were very urgent.

Although the expense need not be heavy, the provision of masts and meteorological organisations took a considerable time to complete—he was told as long as two years. If the programme of demonstration flights was to be carried out without delay, the orders for the mooring masts ought to be given immediately, and arrangements made without delay for the meteorological organisations.

"There, then," concluded Sir Samuel, "was a picture of the Empire air route programme upon which I ask for your advice and co-operation. I do not believe that I am either a fanatic or a visionary in asking your support for these schemes. If they prove successful they may give a physical unity to the Empire that it has never possessed before. Hitherto the invention of flying has brought more harm than good to the Empire and to the world. The aeroplane, the symbol of the terrible methods of modern warfare, has made these shores for the first time for centuries vulnerable to foreign attack. It has added to the budget of National expenditure, it has complicated almost every problem of defence. Let us try to redress this balance by insisting that the aeroplane shall be used not only for the purposes of destruction, but also for the objects of peace and goodwill. Hitherto the air has been the scene of glorious though terrible conflicts; it has been the background from which death and destruction have been hurled upon camp and cities. The purest of the elements was not intended for the destruction of civilisation by high explosive or poison gas. The invention of the flying machine, which the pioneers of successive centuries strove to achieve, was meant for something better than an instrument of concentrated frightfulness. With the horror of the last war in our memories and the limitless terrors of any future war in our minds, let us make the air a highway of peace, and the aeroplane an instrument, not for severing nations and destroying civilised life, but for making closer and more constant the unity of Imperial thought, Imperial intercourse and Imperial ideals."

In the discussion that followed Sir Samuel's speech, several of the Dominions' representatives, made some important speeches, from which we quote as below.

Mr. Mackenzie King, Prime Minister of Canada, said they had been thrilled by the survey given by the Secretary of State for Air of the Air Communication Programme of the Empire. It was, he thought, prophetic, but it certainly suggested a solution of many of the problems of communication between different parts of the Empire to which hitherto distance had presented formidable barriers.

"May I, first, say" proceeded Mr. King," that the Canadian Government will only too readily co-operate with the British Government in the way Sir Samuel Hoare has suggested, by immediately taking steps to see that mooring masts to secure the landing-places for airships in Canada are erected; also that the work of meteorological organisation is commenced forthwith."

Canada, he said, was assisting civil aviation by doing pioneer work; by establishing air harbours and aerodromes; by training of civilian pilots; by design and manufacture of new types of machines; and by the training of mechanics in technical schools. Air survey work had been developed to a greater extent probably than by any other nation, and a great deal of mapping of undeveloped and unexplored country had been accomplished, or was in the programme for future work. Aerial photography had been greatly developed, and the visits to Canada of Colonel Winterbotham, of the Geographical Section, General Staff, War Office, and Colonel Ryder, of the Aerial Survey Company, had helped to bring about close co-operation between Canada and the other parts of the Empire.

A main duty of the Aerial Services of Canada, Dominion and Provincial, was Forestry Protection. In no part of the world had it reached such a state of efficiency as in Canada.

As civil aviation had a direct relation to the creation of a military air force and served to create a reserve thereto, in this field Canada might be in a position to lend very great assistance in Imperial defence. By the Air Force Regulations, an individual who obtained a pilot's certificate automatically became a reservist. Regulations had been prepared governing the formation of an Air Force Reserve and outlining the organization of an Aviation Association with branches in each province. Finally, when it was desired to extend an airship service to Canada the Canadian Government would be ready to consider methods of co-operation, as, for example, by the establishment of air bases. Possibly Canada would also be able to assist by the provision of helium gas, which could be extracted in the Dominion.

Mr. Bruce, Prime Minister of Australia, in his opening remarks referred to the pioneer flights by the Smith Brothers, Parer, MacIntosh, and Sir Alan Cobham as examples of what could be done in regard to air development as put forward by the Secretary of State for Air. If, said Mr. Bruce, India and Burma would co-operate as suggested, they (Australia) would most certainly be prepared to consider the question of doing their part by way of experimental flights with the British squadron—such flights being of great value from the training aspect, apart from ascertaining the possiblity of an air route from Singapore to Australia.

The services that had been established in Australia pointed to the fact that commercial flying was now established on a practical basis and that one could cover great distances with very great advantage. Both Mr. Coates and he had flown 500 miles during their journey to the Conference, thus saving a four-days railway journey across Australia. Mr. Bruce then gave some particulars of the civil air services operating in Australia, which he said had proved of inestimable value to settlers in the outback, by carrying mails and light freight, and by conveying medical aid or transporting sick and injured to hospital.

One contemplated air service of considerable importance to Empire development would operate on the trans-continental route between Perth and Adelaide. If this service were instituted, English letters could be delivered in Adelaide and Sydney three days and in Melbourne four days earlier than at

AT THE CROYDON DEMONSTRATION LAST WEEK: Some of the single-seater fighters getting ready to leave for their "Home Stations."

present. Replies from Adelaide and Melbourne would be enabled to catch a mail earlier than at present. With the routes now opened up the aggregate distance the services covered was 3,267 miles, and actually 7,378 miles were being flown every week, 383,000 miles a year by direct commercial service—not merely a service carrying mails, but a service carrying passengers, which was used as an ordinary means of communication.

His Government, continued Mr. Bruce, believed that commercial aviation would afford them that reserve of personnel and machines which, in an emergency, would be necessary to their fighting forces. They were going ahead in the provision of landing grounds—in all 133 landing grounds had been acquired or based and prepared for civil aviation; there were also 11 private licensed aerodromes in use.

If we got towards the point of its being practicable to continue the service from Britain to Australia, there would be no difficulties once we got to Australia with regard to landing grounds.

Mr. Bruce next referred to various flights in Australia, including that now in progress by Group-Capt. Williams to the South Pacific, particulars of which have already appeared in FLIGHT.

The fact that, generally speaking, the public in Australia did not contemplate it as anything in the nature of an adventure to go on a 1,400 miles, flight indicated that civil aviation had now passed completely out of the experimental stage, and he could see no possible reason why it should not be practicable to lay out the necessary landing grounds and make the necessary arrangements, so that we could have an air route running from Great Britain to Australia and similarly to South Africa. The Government in Australia believed so much in the future of flying there, that they were doing everything in their power to foster it. They were encouraging the formation of light aeroplane flying clubs, and there were three operating already, with a small subsidy for each pilot trained.

In the case of the airship itself, so far as Australia was concerned, probably they possibly together with New Zealand, would benefit most if in fact what was now hoped could be realised, and they would be only too pleased to co-operate. The matter was one of such extraordinary importance to them that he would go so far as to say that if it could be shown that there were reasonable possibilities of airships being perfected sufficiently to do the journey with safety, they would take the risk of a mooring mast, and certainly take the necessary steps to get the meteorological information that was desired.

Mr. Coates, Prime Minister of New Zealand, said that air development in New Zealand was very small—a certain amount of flying on a commercial basis had been done, but he could not say the experience had been altogether satisfactory. Meanwhile, they were devoting their attention entirely to surveys, collecting data, landing grounds, etc. So far, in New Zealand, its people had not the "flying sense," because they had not had the opportunity of obtaining it. If a line connecting the 1,200 miles between them and Australia could be established, it would immediately give them an objective at which to aim.

As regards the mooring mast and airships, New Zealand was intensely interested, but he would like to know more about it before he could say definitely whether New Zealand would become committed to the expenditure involved in the erection of a mast. They were, however, quite willing to join in any practicable scheme under which they could co-operate as suggested.

Mr. Havenga, Minister of Finance for the Union of South Africa, said South Africa had so far considered the question of civil aviation in connection with their Air Force. They did not doubt that when their country was developed further, and there was public interest, there would be opportunities for commercial air transport. In order to stimulate public interest, some time ago, they ran a demonstration air mail between Cape Town and Durban with Air Force machines and pilots, which maintained 100 per cent. efficiency. At present they were leaving this matter to private enterprise.

"With regard," concluded Mr. Havenga, "to the Imperial air scheme, so far as the Union Government is concerned, we shall be very glad to co-operate and do whatever we can. I do not think it will be possible for us to make ourselves responsible for the running of any scheme right up to Uganda; we shall certainly be prepared to maintain the service inside the Union, and as far as the sending of a few experimental flights of our Air Force is concerned I think that could possibly be arranged. We have a number of landing grounds in South Africa—about 70—and our Air Force regularly co-operates with our ordinary defence force in connection with the training of that force. The distance between Cape Town and Johannesburg, 1,000 miles, is repeatedly being flown by our Air Force officers in a day. As far as providing meteorological data is concerned, we have a very efficient department in South Africa for the collection of such data, and the extra information that is required by the Air Minister here could no doubt very easily be obtained. As far as the question of providing a mooring mast is concerned, the Government will carefully consider that."

Mr. McGilligan, Minister for Industry and Commerce, Irish Free State, said aviation in the Irish Free State had been developed so far only on the defence side, civil flying being left to private enterprise, which had made no advance whatever. He had now control of civil aviation as far as Government intervention was concerned, and at the moment they were engaged simply in overhauling the Air Orders and Regulations, so as to bring them fully up to date and comply with all that is implied by their adherence to the International Air Convention.

Referring to the "All Red" route from Canada to the Western Coast of Ireland, Mr. McGilligan said they had hopes that the advantage of their geographical position would now be specially considered in relation to air communications. He assured the Secretary of State that if there was any way in which they could co-operate to their mutual advantage, that co-operation would willingly be given.

Mr. Monroe, Prime Minister of Newfoundland, while stating that they would be willing to help in the way of establishing a landing service, or being in a minor way useful to this (Transatlantic) service, he said they could not see how they could justifiably place an immediate order for a mooring mast. If airships could fly to Canada in 2½ days without refuelling, Newfoundland's usefulness as a stepping stone between Europe and the North American Continent would seem rather to disappear.

Lord Winterton, Parliamentary Under-Secretary of State for India, said India was destined to play a prominent part in the development of air communications between Empire countries. Any service between Europe and the Far East or Australia would on its way have to cross India, and it was reasonable to anticipate that the junction of these two routes, which would almost inevitably be upon Indian soil, would ultimately figure as one of the most vital points in the Empire chain.

India was not a beginner in the matter. The Royal Air Force had a strong contingent in the country, well provided with aerodromes at strategic points and all necessary equipment. In addition, aerodromes intended solely or primarily for civil purposes had been constructed at Calcutta and Allahabad, and land had been acquired and emergency landing grounds were being got ready in other places. Now that the British Government had entered into the contract with Imperial Airways, Limited, for the Egypt-Karachi Service, an era of more rapid development in India was one of the certainties of the near future.

It was expected that within six months the aerodrome at Karachi would be in working order and that this would be followed by important developments in the matter of internal air routes.

With this prospect in view, the whole question of the future of civil aviation in India had been recently under review by the Indian Air Board, which had laid before the Government of India an important memorandum outlining proposals for future action. The view of the Indian Air Board—which had a wide measure of influential support in India—was that the Government of India was now in a position to take, and should take, an active part in the development of air routes touching India. They proposed the Government should take steps to establish a claim to be consulted at all stages on the terms of any contract for an air service in which India was interested, whenever a subsidy or other special assistance was proposed by His Majesty's Government or a Dominion Government. They went further and urged that the Government of India should claim a right to participate as a principal in the contract, with a right to insist on the inclusion of such provisions as might be necessary to promote India's interests, taking their share—on condition, of course, that this claim was admitted—in the financial liabilities of the contract. Further, the Air Board suggested that in future all aerodromes, hangars, quarters, go-downs, telegraph and meteorological apparatus and other necessary equipment should be paid for by the Government of India and should become their property.

The Indian Air Board had recommended a systematic survey of the main probable air routes in India, giving specially early attention, in the first instance, to the Calcutta-Rangoon route, and also the provision of terminal stations,

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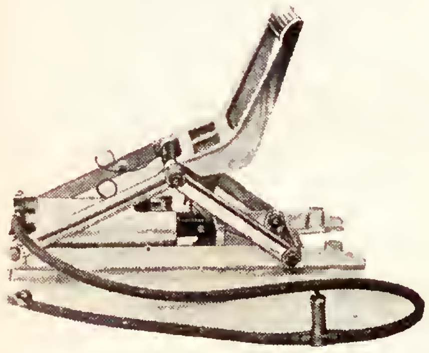

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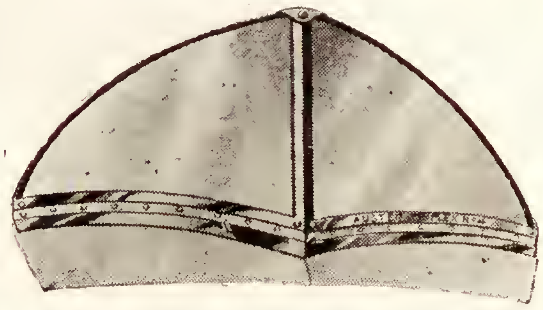

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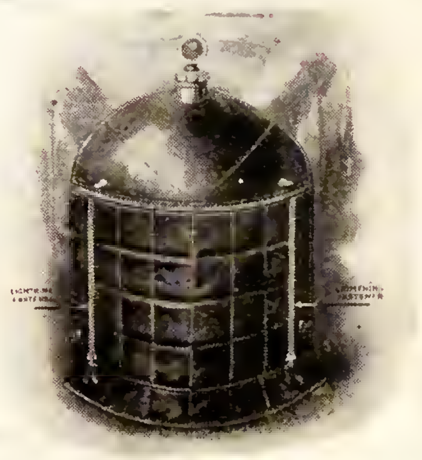

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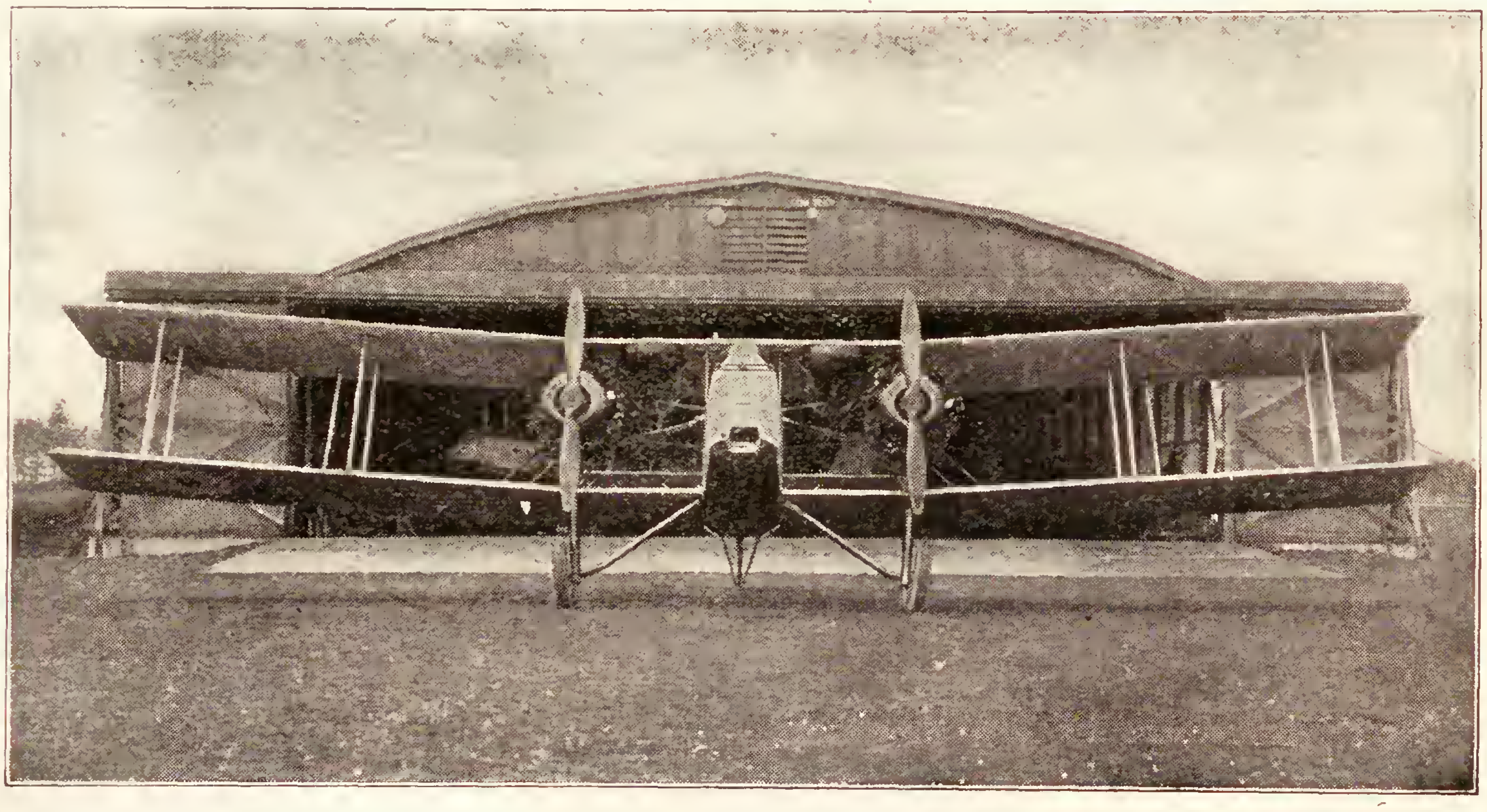

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especially at Calcutta, Rangoon, and Bombay. With the establishment of the Egypt-Karachi service, the development of internal air routes from Karachi was merely a matter of time. It had been decided, therefore, to appoint a Director of Civil Aviation, who would shortly take over his duties.

Concluding, Lord Winterton said: "It is fully realised in India that the adoption of the policy I have outlined would mean expenditure from public revenues on a considerable scale for which there would be no immediate monetary return, and that the pace at which effect could be given to the policy must depend on financial considerations. I have every hope, however, that sufficient funds can be made available to enable real progress to be made in all directions in which the need for advance has made itself urgently felt."

Mr. Amery, as Secretary of State for the Colonies, made several important statements regarding air communications in other parts of the Empire.

With regard to East Africa, the experimental route from the Sudan to the edge of Kenya at Kisumu was the outcome of negotiations between a private company and the East African Governments and Sudan Government. He had every confidence that if that experimental service should prove to be a success, the East African Governments generally would consider a further extension of the service southwards, and so be in a position to link up with Northern and Southern Rhodesia, and so with the Union. He thought, from the point of view of the establishing of white civilisation as a guiding influence over the whole of East Africa, it was very important that that region should be in close contact both with England one way and with the white civilisation rooted in the native soil in the south.

There were two other main Empire routes in the Colonial service which would be of importance: one of these was a route connecting Nigeria with the Sudan, whilst the problem of linking the West Indian islands by some cheap and speedy method of transport made an inquiry into the use of the aeroplane, or seaplane, for West Indian purposes a matter of considerable importance. Apart from the main importance in the way of communications which linked up these various scattered Dependencies to this country and to the Dominions, there was the importance of internal development. He added that he was impressed at Croydon the other day by Mrs. Eliott Lynn pushing her little "Moth" aeroplane, fixing its wings, and then flying off. In a country like East Africa, where the white population was scattered, this sort of thing would make life much more easy, and might create a tremendous economic revolution in the possibility of the development of Africa.

Referring to the spraying of cotton fields from aeroplanes, Mr. Amery said this suggested that the greatest of all obstacles to civilisation and progress in Africa—the tsetse fly—might conceivably be some day dealt with by this method. He also referred to the importance the aeroplane could have in archæology, as he was very much impressed during the thousands of miles he flew over Iraq by the way in which the past history of the country was revealed from above, in a manner which could never be realised from the ground.

Regarding the airship, Mr. Amery said he had always been a convinced believer in the immense possibilities of the airship, not only from the point of view of regular night and day services over long distances, but because it was going to play a great part in altering the whole internal social structure of the Empire. The whole question of the business development of more distant parts of the Empire would be fundamentally altered if the business man could spare the time within a month to run to Australia or New Zealand, see a proposition for himself fully, and come back with his report. The men who could spare the month were a hundred times as numerous as the men who could spare five or six months. It would affect, he thought, the whole question of Empire settlement.

He thought that our ideas of the shortest routes from one part of the Empire to another would be very much modified by the airship. Newfoundland might not be the handiest point between this country and Canada, but some day perhaps a normal route would be over the Polar Seas. He did not wish to adventure too far on the paths of romance, but he felt very strongly that the airship was going to be an immensely potent factor—even in our time—in all our arrangements for the future, and it did, therefore, deserve the keenest study, approached with that cautious spirit to which the Secretary of State for Air referred.

THE ROYAL AIR FORCE

London Gazette, October 26, 1926.

General Duties Branch

Pilot Officer H. E. Nowell is promoted to rank of Flying Officer with effect from Sept. 9, and with seniority of June 17; Pilot Officer on probation J. F. Dowdeswell is confirmed in rank (Oct. 4).

The following are transferred to the Reserve:—

Class A.—Squadron-Leader.—J. R. Howlett (Oct. 24).

Flight-Lieuts.—E. E. Deans, D.S.C., W. E. C. B. C. Forsyth, C. Pilkington, A.F.C., W. G. Preston, D.F.C., E. P. Roberts, M.C., D.F.C., D.C.M. (Oct. 24) H. C. Black (Oct. 27); R. S. P. Boby (Oct. 28).

Flying Officers.—T. Brewin, W. Halford, D.F.C., P. Harris, B. E. Herbert, D.C.M., F. A. O'Brien, S. H. Potter, R. J. Read (Oct. 24).

Class B.—Flight-Lieuts.—S. Symonds (Oct. 24); R. E. H. Daniel (Oct. 28). *Flying Officers.*—C. C. Clark, G. W. Mahony-Whitton (Oct. 24).

Class C.—Flight-Lieut.—W. S. Watson (Oct. 24).

The following Flying Officers relinquish their temp. commns. on return to Army duty:—E. M. Drummond (Lieut., Black Watch) (Sept. 6); E. C. Ridlington (Lieut., R.A.), D. Stansby (Lieut., R.A.) (Oct. 16). The short service commns. of the following Pilot Officers on probation are terminated on cessation of duty (Oct. 27):—A. E. G. Eccleston, J. W. O. Fuller, C. G. Grenfell. Flying Officer H. V. Alder is dismissed the service by sentence of General Court Martial (Oct. 11).

Stores Branch

Pilot Officer on probation G. L. Worthington is confirmed in rank and is promoted to rank of Flying Officer (Oct. 6); Pilot Officer on probation H. M. S. Dawes is confirmed in rank (Oct. 6).

Medical Branch

H. Penman, M.B., is granted a short service commn. as Flying Officer, for three years on Active List, with effect from and with seniority of Oct. 8; Flying Officer N. I. Smith, M.B., ceases to be seconded to King's Cross Hospital, Dundee (Oct. 8); Flieut.-Lieut. T. M. Walker is transferred to Reserve, Class D.2. (Oct. 25).

Chaplains' Branch.

The Rev. R. E. V. Hanson, O.B.E., M.A., is appointed Chaplain-in-Chief, R.A.F. (Oct. 25); the Rev. G. H. Collier, M.A., is granted the local relative rank of Wing-Comdr. whilst employed as Senior Chaplain (Iraq) (Oct. 1); the Rev. W. T. Rees, B.D., relinquishes the local relative rank of Wing-Comdr. on ceasing to be employed as Senior Chaplain (Iraq) (Sept. 21); the Rev. H. D. L. Viener, C.B.E., M.A., K.H.C., relinquishes appointment of Chaplain-in-Chief, R.A.F., and is placed on retired list (Oct. 25).

AUXILIARY AIR FORCE

General Duties Branch

The following to be Pilot Officer:—*No.* 600 *City of London* (*Bombing*) *Squadron.*—H. O. Young (Oct. 26).

Princess Mary's R.A.F. Nursing Service

Sister Miss W. E. Molesworth relinquishes the acting rank of Matron (Oct. 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C., to H.Q., Inland Area, Stanmore, on appointment as Air Officer Commanding; 1.11.26.

Air Commodores: F. C. Halahan, C.M.G., C.B.E., D.S.O., M.V.O., to H.Q., Cranwell, on appointment as Air Officer Commanding; 1.11.26. A. E. Borton, C.B., C.M.G., D.S.O., A.F.C., to Air Ministry, on appointment as Director of Personal Services; 1.11.26.

Wing Commander W. B. Callaway, A.F.C., to R.A.F. Depot, Uxbridge; 30.9.26.

Squadron Leader W. H. Longton, D.F.C., A.F.C., to No. 1 Flying Training Sch., Netheravon; 18.10.26.

Stores Branch

Flight Lieutenant G. F. Law, to Air Ministry, Directorate of Equipment; 1.11.26.

Flying Officers: H. Parker, to No. 60 Sqdn., India; 1.10.26. F. A. R. Smith, to No. 2 Wing H.Q., India; 1.10.26. L. L. Bray, to Station H.Q., Upavon; 15.10.26.

Accountant Branch

Flying Officers: F. H. Wakeford, to No. 1 Sch. of Tech. Training; (Apprentices), Halton; 5.10.26. C. E. Aston, to No. 503 Sqdn., Waddington. 7.10.26. C. Lorimer, to No. 502 Sqdn., Aldergrove; 11.8.26.

Pilot Officers: J. Lambie, to No. 4 Sqdn., S. Farnborough; 11.8.26. R. A. J. Mullarkey, to R.A.F. Base, Calshot; 7.10.26.

Medical Branch

Flight Lieutenants: T. V. O'Brien, M.B., to H.Q., Iraq; 1.10.26. F. T. Allen, to R.A.F. Depot, Uxbridge; 6.11.26. R. W. White, to Aeroplane and Armament Experimental Estabt., Martlesham Heath; 3.11.26. F. P. Schofield, to Palestine General Hospital; 1.10.26.

Flying Officers: P. D. Barling, M.B., to No. 208 Sqdn., Egypt; 1.10.26. M. J. Marren, M.B., to Station H.Q., Upavon; 16.9.26. H. Penman, M.B., to R.A.F. Depot, Uxbridge; 1.11.26.

Chaplains' Branch

Rev. R. E. V. Hanson, O.B.E., M.A., to Air Ministry, on appointment as Chaplain-in-Chief; 26.10.26.

FROM THE FOUR WINDS

Eastward Ho! by Light 'Plane

Two members of the go-ahead Lancashire Light Aeroplane Club—Mr. T. N. Stack, club instructor, and Capt. B. S. Leete—hope to set out from Stag Lane one day this week in two D.H. "Moth" aeroplanes for a destination at present unknown, but probably India. The venture is somewhat in the nature of a holiday tour, combined with the intention of establishing a long-distance record for light aeroplanes. Both their "Moths" have been converted into single-seaters, and extra petrol tanks installed. FLIGHT wishes them both every success in their undertaking.

U.S. "Schneider Cup" Pilot Killed

LIEUT. FRANK CONANT, one of the American pilots entered for the forthcoming Schneider Cup race, was killed whilst making a practice flight on a Curtiss seaplane at Winter Harbour (near Norfolk, Va.) on October 30. Lieut. Conant had previously, on October 26, attained a speed on this machine reported to be well over 250 m.p.h.

Flying in Burma

MR. VINCENT, who has been engaged in aerial survey work in Borneo, has experienced similar worries to those which befell Sir Alan Cobham in that troublesome monsoon area in Burma. Whilst flying from Singapore to Rangoon he was forced to descend at Victoria Point by torrential rain. He proceeded on his way last week, but engine trouble brought him down near Kobin village. For some days there was no further news of his whereabouts, until on November 2 he arrived safely at Rangoon.

ƃuıʎlℲ Record

FLYING a specially equipped Sopwith "Snipe" at Henlow on November 1, Flight-Lieut. H. C. Calvey, R.A.F., established a remarkable record for upside-down flight. From an altitude of about 3,000 ft. he circled the aerodrome, upside-down, for 7 mins. 4 secs.

Australian Pacific Flight

GROUP-CAPT. WILLIAMS, who is engaged in a survey flight of the South Pacific Islands in a D.H.50 seaplane, reached Kieta, Solomon Islands, on October 30, and proceeded next day to Gizo, *via* Shortland Island.

New World's Record

A NEW world's record for distance in a straight line without landing was established on October 29 by the two French aviators Coste and Rignot. Starting from Le Bourget at 6.14 a.m. on the Breguet 19, with 500 h.p. Hispano-Suiza, the aviators landed at Djack, roughly half-way between Bandar Abbas and Charbar on the coast of the Persian Gulf, at 2.15 p.m., 32 hours later, having covered a distance which, pending official homologation, is estimated at 5,370 km. (3,340 miles). It had been intended to attempt to reach Charbar, but the coming of darkness prevented the French aviators from reaching their goal. The average speed, reckoned on a straight-line course, was just over 100 m.p.h., although the actual speed, owing to the route followed, was a good deal higher.

Sir Alan Cobham at the Albert Hall

ON Saturday, November 13, Sir Alan Cobham is giving two lectures on his recent flight to Australia and back, one at 2.30 p.m. and one at 8.30 p.m. The lecture will be illustrated by lantern slides from photographs obtained during the flight, and promises to be of quite unusual interest. In view of the fact that the lectures are being given on a Saturday it is advisable to book seats early.

A Featherweight Revs. Indicator

THE saving of weight is one of the shrines at which all aircraft engineers worship, and in the field of aircraft instruments this saving is one of some considerable importance, especially in view of the rate at which the number of instruments on modern aircraft continues to increase. In pursuance of a determined policy S. Smith and Sons of Cricklewood have just recently brought out a revolution indicator in which not only weight but also dashboard space is saved. The new revs. indicator measures but $3\frac{3}{4}$ in. square, has a dial of $3\frac{9}{16}$ in. diameter, and weighs but 28 ozs. If Smith's continue at this rate with their other instruments this part of the equipment will soon be a negligible quantity as regards weight.

Royal Air Force Chaplain-in-Chief

THE Air Ministry announces:—The Reverend R. F. Vernon Hanson, O.B.E., M.A., has been appointed Chaplain-in-Chief to the Royal Air Force, with effect from the 25th October, vice the Reverend H. D. L. Viener, C.B.E., M.A., placed on the retired list.

The Reverend H. D. L. Viener, C.B.E., M.A., Honorary Chaplain to the King, was educated at Malvern and St. John's College, Oxford. He served as a Chaplain in the Royal Navy from 1901 until May, 1918, when his services were lent to the Air Ministry in connection with the organisation of the Chaplaincy Services of the then newly-formed Royal Air Force. He was appointed Chaplain-in-Chief in November, 1918.

The Reverend R. F. V. Hanson, O.B.E., M.A., was educated at King's College, London, and Emmanual College, Cambridge He entered the Royal Army Chaplain's Department in 1900, and transferred to the Royal Air Force in November, 1918. During the past two years, he was been officiating as R.A.F. Chaplain at Manston.

Air Mail Suspension

THE Postmaster-General announces that the Königsberg-Moscow Air Mail service (shown under Route 9A, on page 2 of the current Air Mail Leaflet, July, 1926 edition) will be syspended for the winter as from October 30. The last despatch of letters for onward transmission to Russia by this service was accordingly that closed at the General Post Office, London, at 6 p.m., on October 28.

Royal Air Force Flying Accident

THE Air Ministry regrets to announce that as the result of an accident at sea, 5½ miles north of Valletta, Malta, to an Avro "Bison" of No. 423 Flight, on October 21, Hugh Nelson Lay, Lieut., Royal Navy, Flying Officer, Royal Air Force, the pilot of the aircraft, Lieut. Joseph Ennis Sclater Anderson, Royal Navy, Lieut. Henry Leigh Carslake, Royal Navy, and No. J.81144 Telegraphist Robert William Gibbs, Royal Navy, were drowned.

⁂ ⁂ ⁂ ⁂

PUBLICATIONS RECEIVED

Aeronautical Research Committee. Reports and Memoranda: No. 1019 (*Ae.* 220)—Note on a Hot-Wire Speed and Direction Meter. By L. F. G. Simmons and A. Bailey. February, 1926. Price 9*d*. net. *No.* 1027 (*Ae.* 225)—Test of Two Aerofoils, R.A.F. 27 and R.A.F. 28. By A. S. Hartshorn and H. Davies. April, 1926. Price 9*d*. net. *No.* 1038 (*M.* 47)—Report on the Accelerated Ageing of "Y" Alloy. By S. L. Archbutt and J. D. Grogan. April, 1926. Price 9*d*. net. H.M. Stationery Office, Kingsway, London, W.C.2.

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AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.e. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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Chatham 627; "Seaplanes," Rochester.
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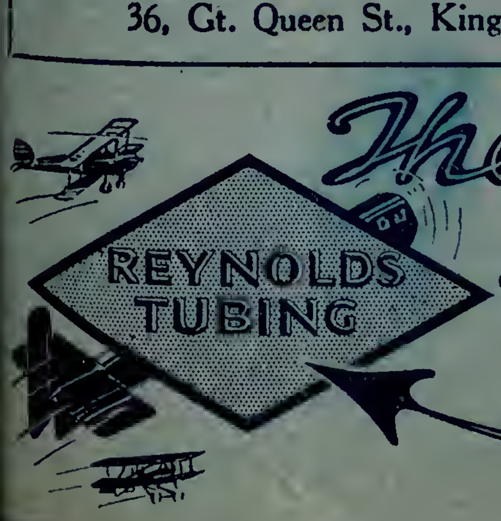

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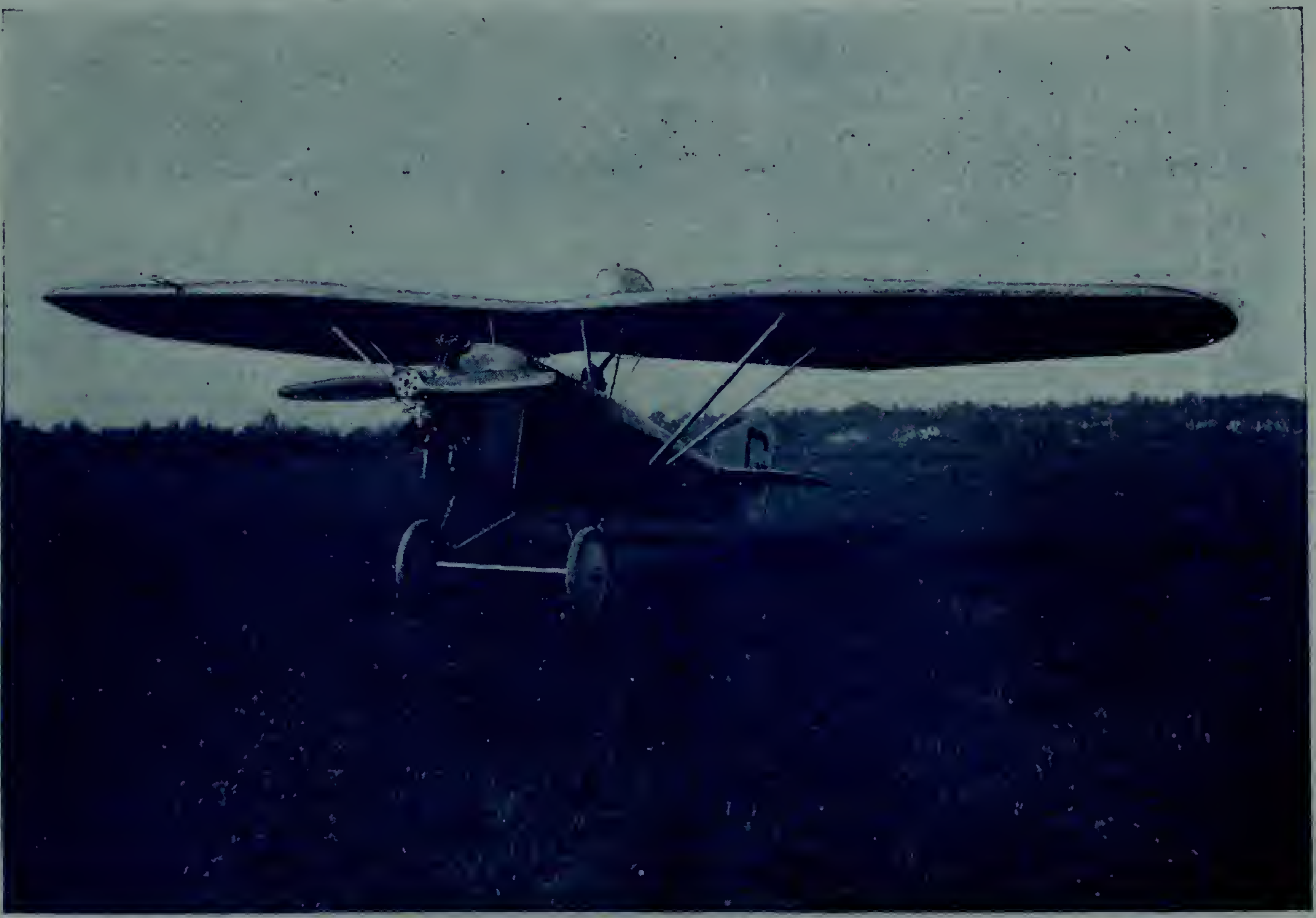

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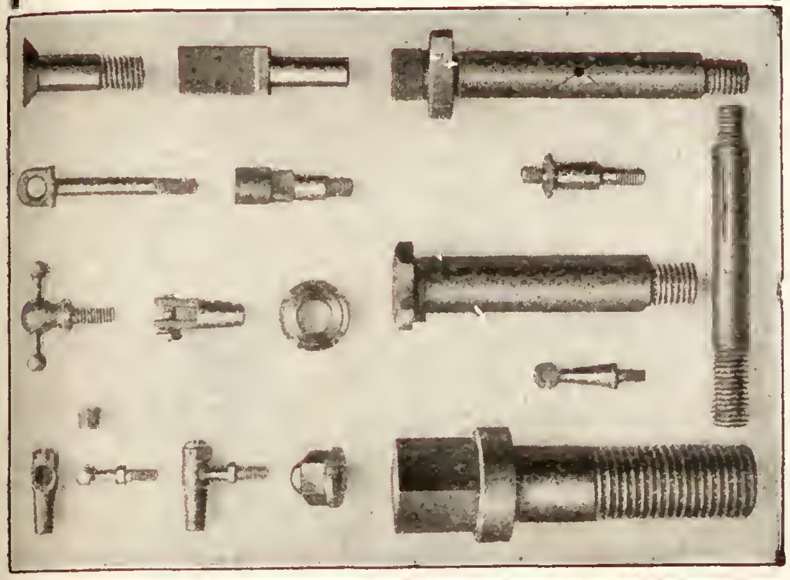

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Nov. 11	.... Schneider Cup Race at Norfolk, Virginia, U.S.A.
Nov. 16	.... Mr. A. G. von Baumhauer, Sub-Director of the Government Aeronautical Laboratories, Amsterdam. "Some Notes on the Possibilities of Progress in Aviation," before Inst.Ae.E.
Nov. 18	.... Mr. R. S. Capon. "Methods of Performance Testing and Analysis," before R.Ae.S.
Nov. 21	.... Lecture, "Meteorology in the Service of Msn," by Dr. G. C. Simpson, C.B., at the Guildhouse, Eccleston Square, S.W.1.
Nov. 30	.... Mr. F. S. Barton, M.A., F.Inst.P. "Air Photography Apparatus," before Inst.Ae.E.
Dec. 2	.... Mr. P. B. Bradshaw. "Alloy Steels for Aero Work," before R.Ae.S.
Dec. 3-19	.... Paris Aero Show

EDITORIAL COMMENT.

Real Commercial Aviation

WHILE passenger air routes in Europe are struggling along by the aid of government subsidies, and this applies to Europe in general and not solely, nor particularly, to England, there is at least one branch of civil aviation which has so far managed to work out its own salvation, unaided by such artificial forms of encouragement as subsidies and grants and machines on the "hire-purchase system." Aerial Surveying, like other forms of aviation, has had its difficulties. In the first place the art, or science, whichever way one prefers to regard it, of aerial surveying, and more particularly surveying by means of aerial photography, has had to find its way. Experimental work of a considerable magnitude has had to be carried out. Special cameras have had to be evolved, and there still remains the rather difficult problem of making an exact allowance for the effect of uneven ground such as mountains and valleys, the former naturally appearing disproportionately large owing to the fact that they are nearer to the lens of the camera. However, it may be said that for all practical purposes these problems have been solved. When it is a question of an aerial photographic survey over country already fairly accurately mapped by previous ground surveys, the height of hills and mountains will be known, and in such cases the correct allowance for "distortion," if one may so term the phenomenon, can be made. Over unknown country the same accuracy will not in general be required and experienced operators, working always in conjunction with ground surveyors, can now obtain really remarkable accuracy in this respect.

It is, therefore, small wonder that aerial surveying has "caught on," to use a colloquialism, in the way it has. The work carried out by the Aerial Survey Company has demonstrated the enormous saving in time as compared with the older methods which air surveying can effect. Not only so, but by making use of aircraft under certain conditions, surveys become possible which could not be made by any other means. The question of cost is always a relative one, and in air surveying it so happens that the cost is very low compared with that involved in the old method. Thus it comes about that here we have, ready to hand, a branch of civil aviation which is at once a commercial proposition. The Aerial Survey Company and the Aircraft Operating Company deserve every credit for having taken the lead in this branch of aviation, which, apart from the direct benefits to the companies directly concerned, must necessarily reflect favourably on British aviation in general, by the demand for machines and engines which it will create, and indirectly by the prestige which it will establish. Already we can claim to have established a leading position in this important branch of aviation, and every effort should be made not only to maintain but to increase this lead.

There is another side to the question of aerial surveying the value of which should not be overlooked. We refer to the experience with British aircraft in out-of-the-way places and under climatic conditions very trying for the machines. Experience is being gained and knowledge accumulated which must have a beneficial effect upon the development of aircraft design and construction. The behaviour of machines of different types under varying conditions; the manner in which different materials stand up to the extremes of cold and heat encountered; the treatments which have to be given to certain materials in order to protect them, problems such as these will be met with in the everyday work of air survey expeditions. The experience thus gained, if placed, as we have no doubt it will be, before the constructors of the machines concerned, cannot fail to assist very materially towards improved construction. Altogether air surveying is a branch of civil aviation (not forgetting its military and service value) which is worth watching very closely. As yet but a small beginning has been made. There is no telling how far this beginning will lead.

◆ ◆ ◆

Small Three-engined Aeroplanes

On several occasions recently we have referred to the subject of small three-engined aeroplanes, pointing out that in many parts of the British Empire there should be a market for machines of this type, for use on air routes where the volume of traffic is not as yet great enough to justify the use of large machines, but where the reliability of the three-engined arrangement is essential to success. The particulars given this week of the new "Cirrus Mark II" engine brings this subject to the fore once more, the engine being one which, it would appear, might lend itself admirably to installation in a fairly small three-engined machine, apart, of course, from its obvious suitability for low-power two-seaters of more normal type.

If one looks into the figures for the "Cirrus, Mark II," one finds that the weight is 270 lbs. for a maximum power of 84 b.h.p. and a normal power of 78 b.h.p. In this connection it is of interest to note that the weight of the "Puma" is about 640 lbs. dry. The weight of three "Cirrus" engines would be 810 lbs. By the time one has added the weight of radiator and cooling water to the "Puma" the weight in running order will probably not be very far short of this figure. Now, one of the most successful small commercial aeroplanes ever built is the de Havilland 50 with "Puma" engine. The three "Cirrus" engines would develop approximately the same total power as the "Puma," and thus the D.H. 50 would seem to offer a suitable basis on which to work. This machine carries four passengers, or, expressed in another way, approximately 1,000 lbs. of paying load. Assuming that the weight of three "Cirrus" engines would be near enough the same as that of one "Puma," presumably one might expect to get, with the small three-engined machine, a paying load of, at any rate, somewhere near this figure. The placing of two of the three engines on the wings would probably somewhat alter the structure weight, and their extra resistance might be expected to lower the performance slightly, although with the small frontal area of the "Cirrus" the resistance should certainly not be unduly high. The top speed of the "Puma" D.H. 50 is, we believe, 112 m.p.h. at 3,000 ft. Even if the three-engined machine should sacrifice the odd 12 m.p.h., it would still be a very serviceable machine for many localities (it is not suggested that such a machine be used on the London–Paris route, for instance), while a paying load of somewhere in the neighbourhood of 1,000 lbs. should be sufficient for quite a large number of routes in various parts of the British Empire.

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The Schneider Cup Race

The race for the Schneider Cup is, weather permitting, being flown to-day, November 11, at Norfolk, Virginia. The result will not, of course, be known in this country in time to be included in this week's issue of FLIGHT, although it will be known to our readers by the time this week's issue reaches most of them. The outcome is a matter for speculation. Last year there was very little hope of the Italian challenger beating the Americans. The type of machine sent over was, obviously, hopelessly outclassed. This year, however, it is rather a different story. The Macchi machines built for the race, judged from photographs, are very businesslike affairs, and frontal area appears to have been cut down to an absolute minimum. At the same time, the form of the fuselages is as carefully streamlined as possible, and, as the Fiat engines are reported to develop something like 800 h.p., the Italian challengers should have a very good chance.

The Americans, on the other hand, have not been idle, and have further "cleaned up" last year's machines, although this scarcely seemed possible. They are reported to have fitted Packard engines instead of the Curtiss engines used last year, although at the moment of writing this report has not been confirmed. The Americans have doubtless had a good deal more experience than the Italians, which will count for a great deal, although it is known that the challengers have been practising diligently. Both nations have, unfortunately, lost valuable pilots in training for the race, and this fact will inevitably cast a certain gloom over the proceedings at Norfolk.

As our readers will know, Great Britain is not represented this year, it having been decided to refrain from entering until next year. If the Americans win, the Cup will become their property as the winners three times in five years. Should the Italians win, presumably next year's race will be held in Italy. In that case there is every probability of Great Britain, and very probably France, entering machines.

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THE COPPA D'ITALIA

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OWING to lack of space it has not been possible until now to give particulars of the competition for the *Coppa d'Italia*, which concluded with a high-speed test during the middle of October, and which resulted in a win for Bican piloting an Avia B.H. 11 monoplane with Walter engine. This year's competition was the third, and the win by an Avia pilot resulted in the *Coppa d'Italia* becoming the permanent property of the Milos Bondy firm of Prague, whose machine, piloted by the late Dr. Lhota, won the cup last year, and the rules being that the winner of two out of three competitions retains the cup.

For this year's competition three nations were represented: three Italian machines, two Czechoslovak machines and two German. The eliminating trials, which were held at Montecelio, commenced on October 6 and included a low-speed test over a 3-km. course. The two Avia monoplanes went through their tests on the first day, and on the following day the Udet machine completed its eliminating tests. In the afternoon Dr. Lhota went for a flight in order to test his machine for climb and descent, presumably in view of a climb to 1,000 m. being a part of the high-speed test. On this flight, which was purely a test flight and not an official attempt in the competition, Dr. Lhota was accompanied by his mechanic Volejnik, who, it will be remembered, was also with Dr. Lhota at the French competition at Orly. It is not quite clear what happened, but having reached a considerable altitude the Avia machine was seen to come down in an almost vertical dive with engine running. The speed attained was, of course, very high indeed, and suddenly the wing fabric became detached and the machine crashed into the ground at terrific speed, Dr. Lhota and his mechanic being killed instantly. It seems incredible that a pilot of Dr. Lhota's experience should deliberately carry out such a manœuvre, and it has been suggested as a possible explanation that an elevator control may have broken. Whether this was actually so will probably never be known, but the particular Avia machines used in the competition were not designed for aerobatics, and the makers of the machine, in fact, prohibited any kind of aerobatics. It would therefore seem very unlikely that Dr. Lhota would deliberately dive the machine vertically with the engine running at full throttle. The death of Dr. Lhota was a severe blow to Czechoslovak aviation, and cast gloom over the proceedings in Italy, further tests being deferred until October 12. On this and the following day the remaining competitors passed their eliminating tests, etc.

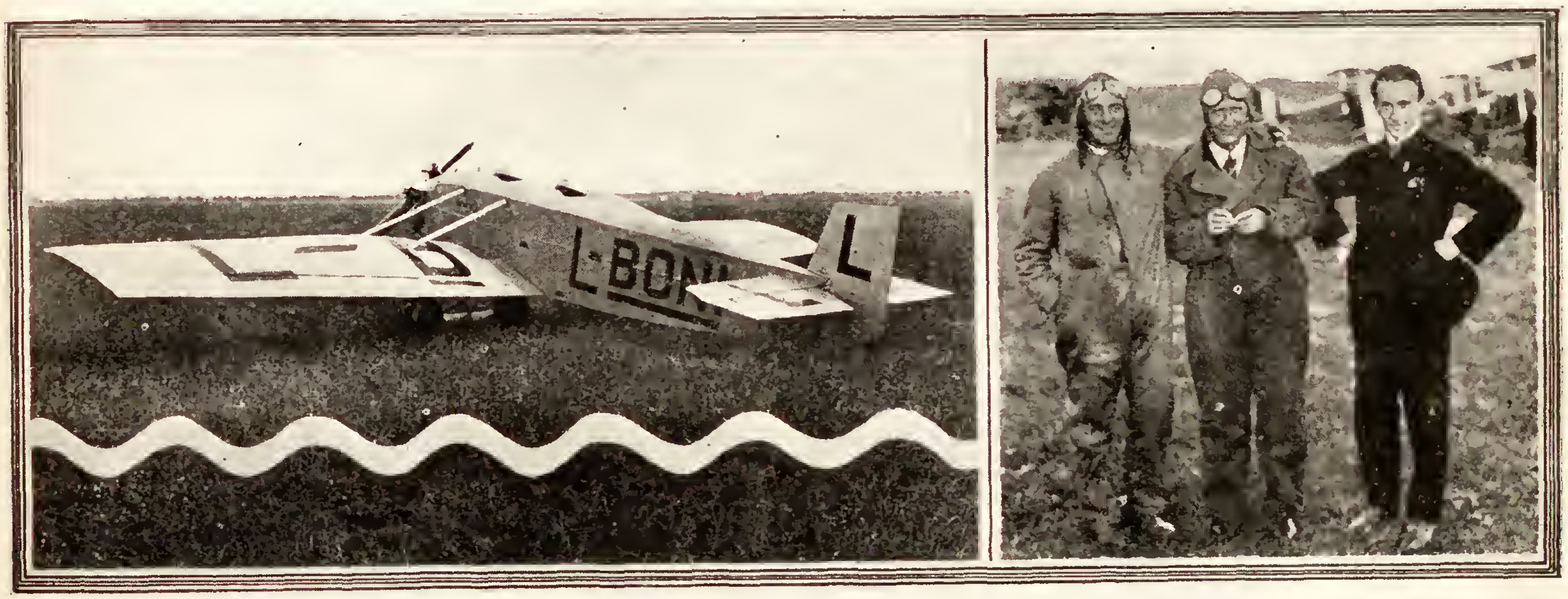
The final part of the competition consisted in a high-speed test over a triangular course of 35·5 km., preceded by a climb to 1,000 m. At the end of the first and second circuit of the course the maximum speed was measured over a 3-km. course. The first to get away for the climb and high-speed test was Bican on the "Avia," who at once made his climb to 1,000 m. and then came down to an altitude of about 50 m. to cross the starting line in flight, the other competitors following at intervals of 1 min. Sartori, on one of the Macchi machines, abandoned the race in the second lap and Canzini abandoned in the third circuit. In the meantime Bican continued lapping with the regularity of a watch, and completed the 300-km. course an easy winner.

The classification in the *Coppa d'Italia* was according to the following formula:—

$$X = V_m \frac{C_u \cdot V_{max}}{C_t \cdot V_{min}}$$

in which V_m is the mean speed in kilometres per hour, *i.e.*, the distance of 301·5 km. divided by the sum of the times taken over the course and for the climb to 1,000 m.; V_{max} the high speed over the 3-km. course; V_{min} the low speed over the 3-km. course; C_u useful load, which included pilot, passenger and ballast but excluded fuel and oil, and C_t the total amount of fuel and oil used.

In the following table particulars are given of the various figures obtained by the three machines which completed the high-speed course. By way of comparison, the figures obtained by the Messerschmitt monoplane with Bristol "Cherub," engine which took part *hors de concours* are included in the table.



WINNERS OF THE 1926 "COPPA D'ITALIA," AND PERMANENT HOLDERS OF THE CUP: On the left the "Avia" B.H.11, with 60 h.p. Walter engine, on which Bican won this year's competition. The group on the right includes Bican, pilot of the machine, Kinsky, his passenger, and Kopexky, Secretary of the Aero Club of Czechoslovakia.

Results Obtained in "Coppa d'Italia"

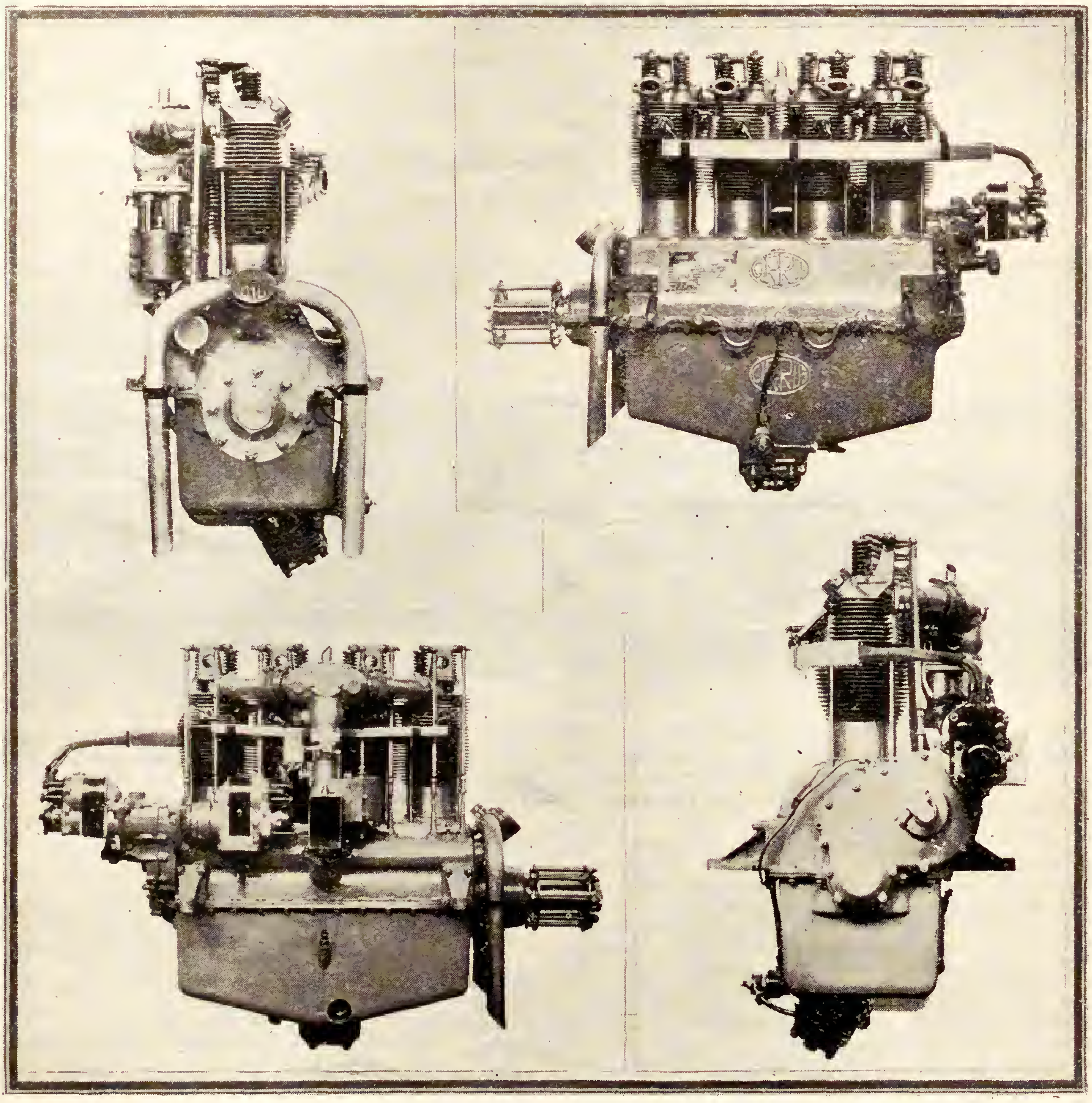
Machine	Avia B.H.11	Macchi M.20	Udet U.12	Messerschmitt*
Engine	Walter 60	Anzani 55	Siemens 80	Bristol "Cherub" 35
Pilot	Bican	Rustici	Sönning	Von Conta
Place	1	2	3	—
Useful load (lbs.)	528	407	519	385
Minimum speed (m.p.h.) ..	41·8	43	43·4	55·8
Time over course	2 06 13	2 31 50	2 29 39	2 50 55
Climb to 1,000 m.	0 12 00	0 20 00	0 14 00	0 14 00
Total time ..	2 18 13	2 51 50	2 43 39	3 04 55
Formula speed (m.p.h.) ..	81·3	65·2	68·6	48·0
Petrol Cons (lbs.)	76·5	74·2	120·0	—
Oil cons. (lbs.) ..	4·12	4·4	16·1	—
Total cons. (lbs.)	80·62	78·6	136·1	39·6
Points scored ..	1,968	1,010	787	—
Corrected high speed (m.p.h.)	95·6	79·8	80·7	72·8

* Took part in competition *hors de concours*.

THE "CIRRUS MARK II" ENGINE

84 B.H.P. at 2,000 R.P.M. ; Weight, 268 lbs.

An increase of 5 mm. in the bore, slightly different cylinder heads, and different connecting rods—these are the main changes which have resulted in an increase in maximum power of from 65 h.p. at 2,000 r.p.m. to 84 h.p. at the same speed, of the "Cirrus Mark II" engine, as compared with Mark I. At the same time the total weight remains to all intents and purposes the same, *i.e.*, 268 lbs. (122 kg.). When the "Cirrus Mark I" was first produced by A.D.C. Aircraft, Ltd., early in 1925, it was designed mainly for the De Havilland "Moth" low-power two-seater, the first of which was then nearing completion. Low first cost, ease of maintenance, and reliability were the main considerations which influenced the design of the "Cirrus," and how well Major Frank Halford succeeded in attaining his aim is now a matter of common knowledge to the world, the "Cirrus-Moth" combination having been not only in hard and regular use at all the light aeroplane clubs in this country, but used extensively in the Dominions, notably in Australia, while large numbers of these machines have been purchased by private owners at home and abroad. From all sides one hears the same report—the "Cirrus-Moth" is simple to fly and maintain, and engine troubles are practically unknown.

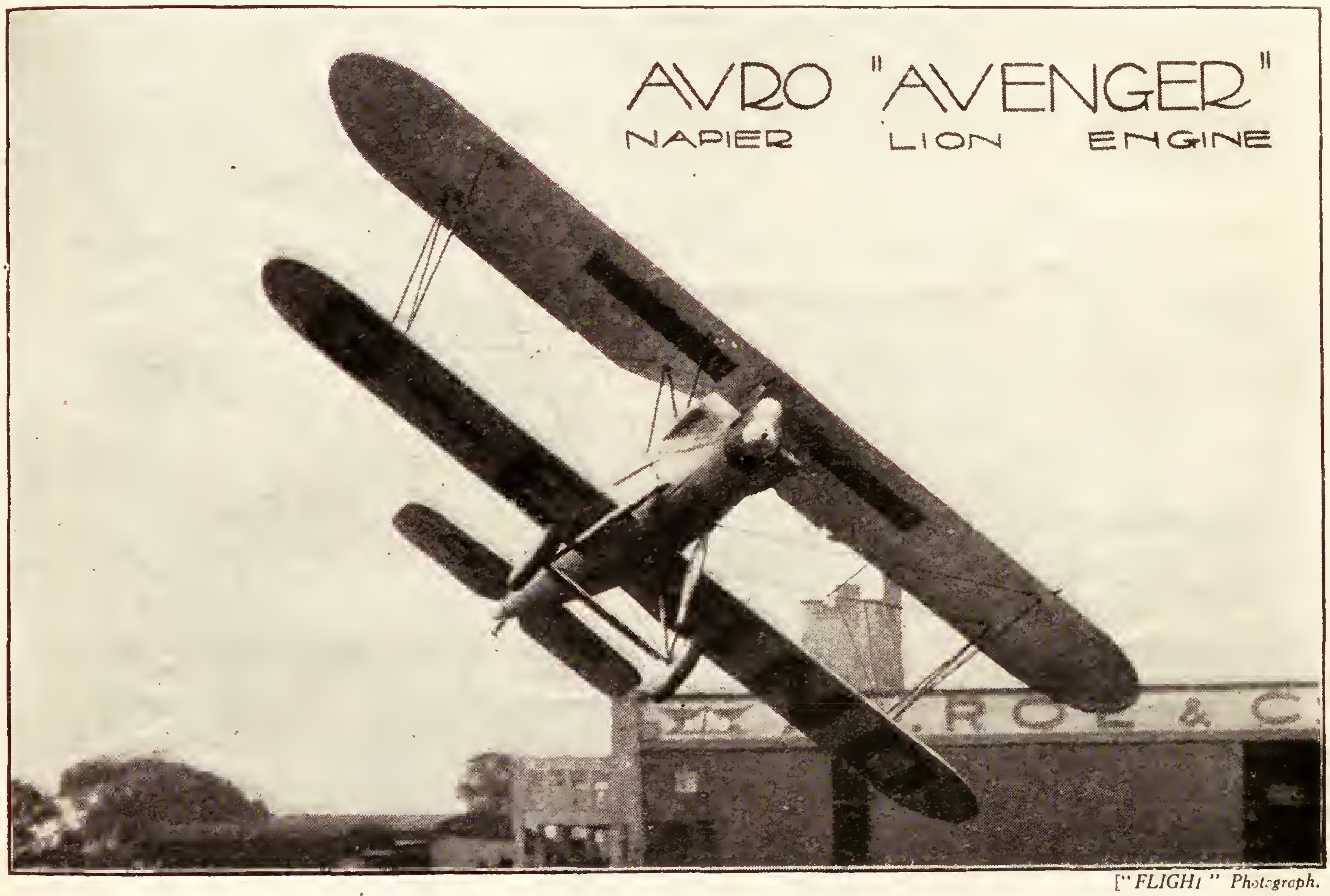


THE "CIRRUS MARK II" ENGINE: Developing a normal power of 78 h.p. at 1,800 r.p.m. and a maximum of 84 h.p. at 2,000 r.p.m., this engine weighs 268 lb. (122 kgs.), giving a specific weight of 3.2 lbs. per h.p.

When the "Cirrus" was first brought out there were many who sniffed somewhat contemptuously at an engine weight of 4 lbs./h.p. Practice has shown, however, that this is not a serious objection, and the De Havilland "Moths" fly very strongly with the Mark I "Cirrus." Their climb, although not spectacular, is sufficiently good for most conditions, and altogether the heavy engine has not shown itself to be such a drawback as some had expected. Running and maintenance costs have, on the other hand, been almost ridiculously small, while the reliability has been such that the idea that a "Cirrus" might fail never occurs to a pilot, and such few instances as have occurred are quite naturally regarded as quite surprising—as much so, in fact, as the failure of a car engine. When this state of affairs is reached, we are approaching the reliability that *should* obtain in aircraft used by private owners, and the pronounced success of the De Havilland "Moth" is easily understood.

While thus the "Cirrus Mark I" has done all that might

AVRO



["FLIGHT" Photograph.

:: INITIATIVE ::

OF all the numerous types of military aircraft which have recently been constructed, none pays greater tribute to the creative genius of British designers, or to the initiative and foresight of British constructors than the AVRO SINGLE SEATER FIGHTER, aptly named THE "AVENGER," which is illustrated above. This machine, which was designed and built entirely by A. V. ROE & CO., LTD., is undoubtedly one of the most striking military aeroplanes in the world.

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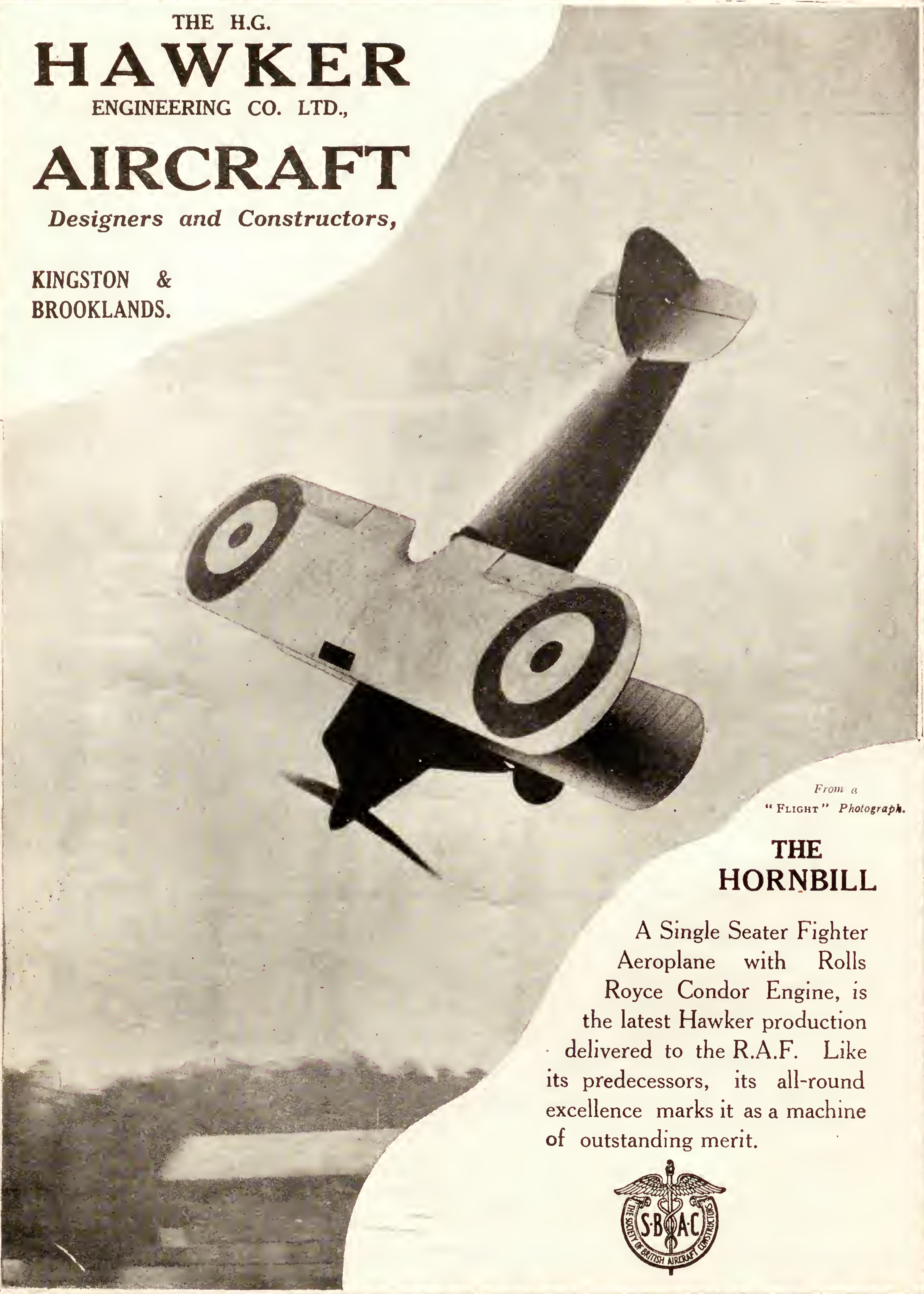

From a "FLIGHT" *Photograph.*

THE HORNBILL

A Single Seater Fighter Aeroplane with Rolls Royce Condor Engine, is the latest Hawker production delivered to the R.A.F. Like its predecessors, its all-round excellence marks it as a machine of outstanding merit.

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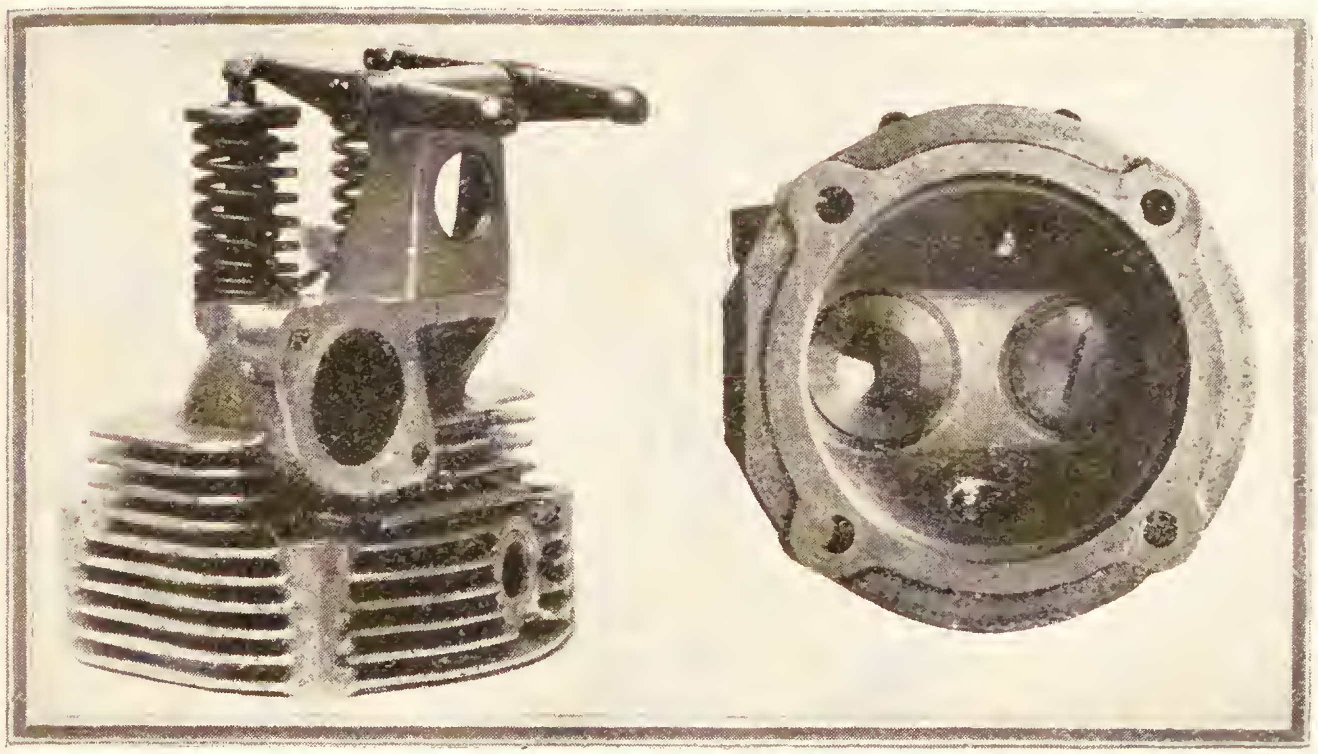
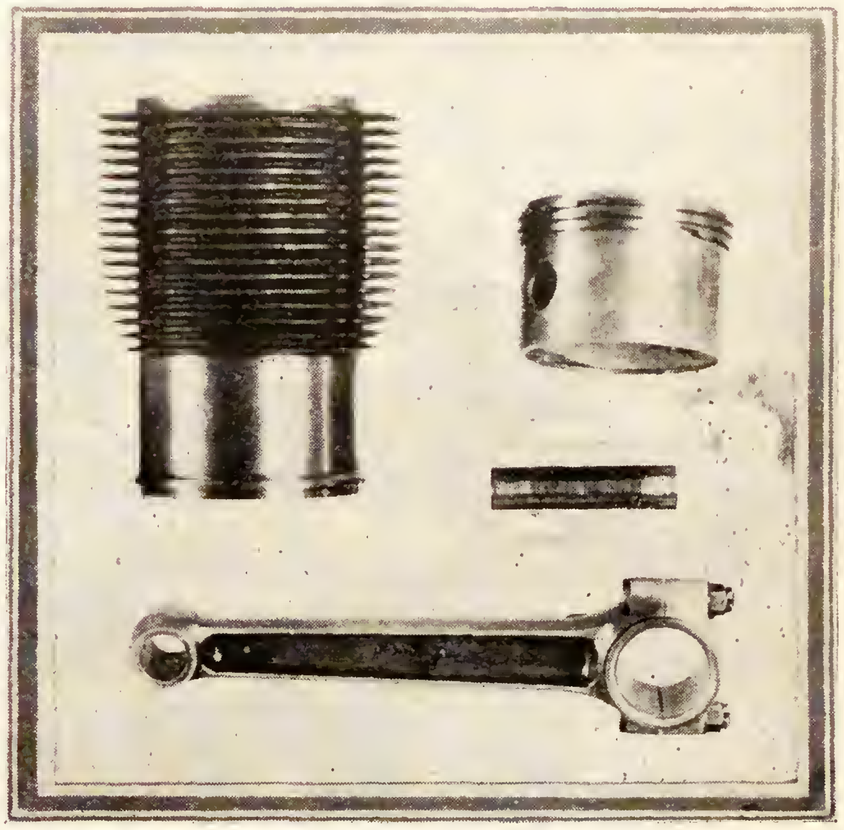
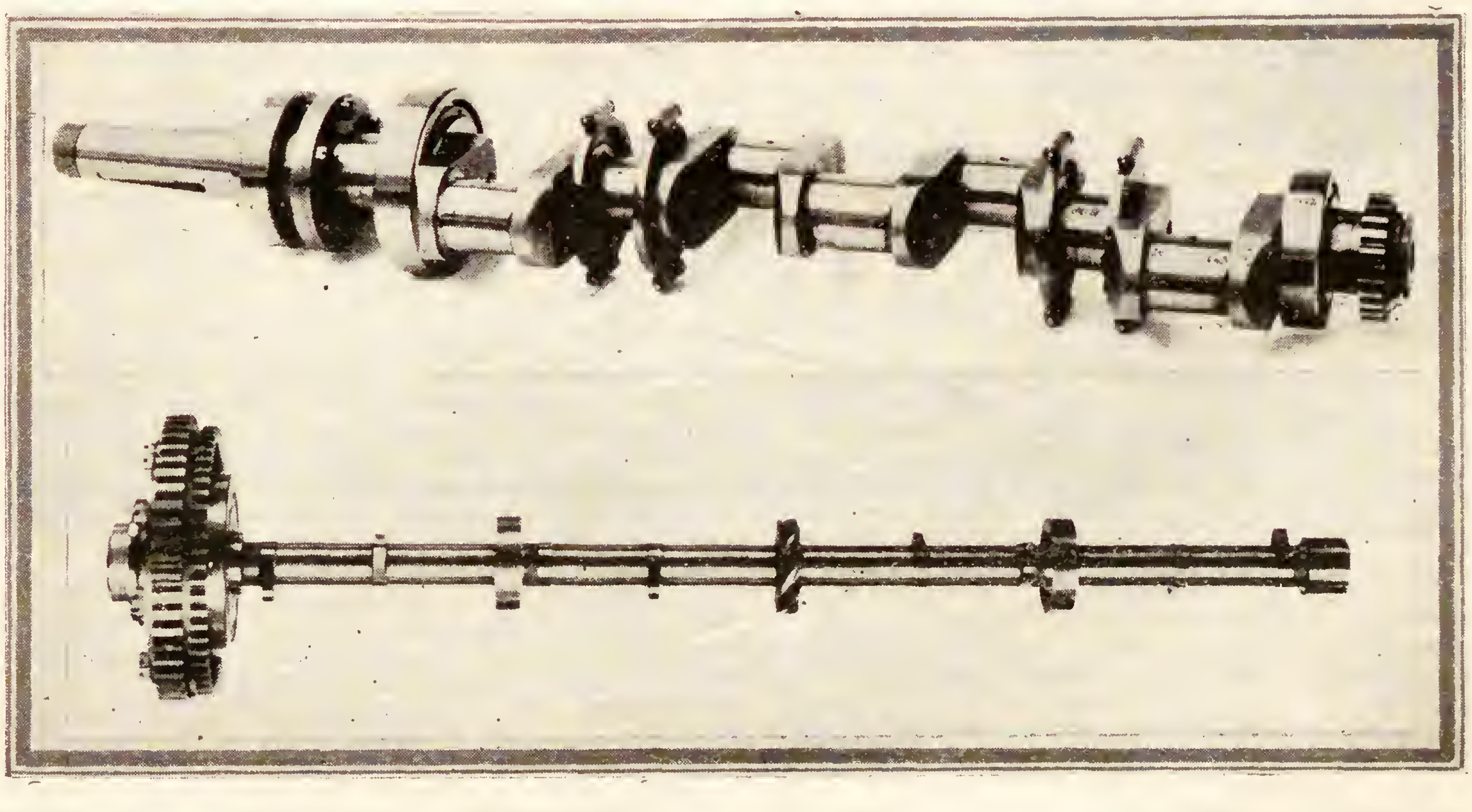


The "Cirrus Mark II" engine: On the left an external view of a cylinder head, and on the right a view inside the head. The inlet valve is on the left.

reasonably be expected of any aero engine, its designer did not regard it as the last word, and he consequently set to work to produce a slightly more powerful version, the Mark II. As already mentioned, the alterations to the older engine necessary to increase the power from 65 h.p. to 84 h.p. at the same speed of revolution were but small, although an increase in power of more than 29 per cent. is, under certain circumstances, very well worth having, especially as it has been attained without increase in weight and, as far as can be judged at the moment, without any sacrifice in reliability. For instance, the private owner who has habitually to take off from rather restricted spaces will find the extra power very useful. One may also imagine the use of machines in hot climates where there is less "lift" in the air, and where consequently a greater nominal power reserve is desirable. Similarly, for operating from aerodromes situated at a considerable altitude above sea level, slightly greater power than that given by the Mark I engine is to be welcomed, and so it is not difficult to see the reason for the production of the Mark II "Cirrus" engine. Again, for small seaplanes in hot climates a slight increase in power would doubtless be useful, although the Short "Mussel" is an excellent demonstration of what can be done in this way even with the original "Cirrus."

From what has been said in the foregoing it will be clear that the "Cirrus" Mark II does not supersede the older model, but offers a very useful choice between two models, according to individual requirements. Many will doubtless find the older model quite sufficient for their needs, but for those who desire, for some reason or another, a slightly more powerful

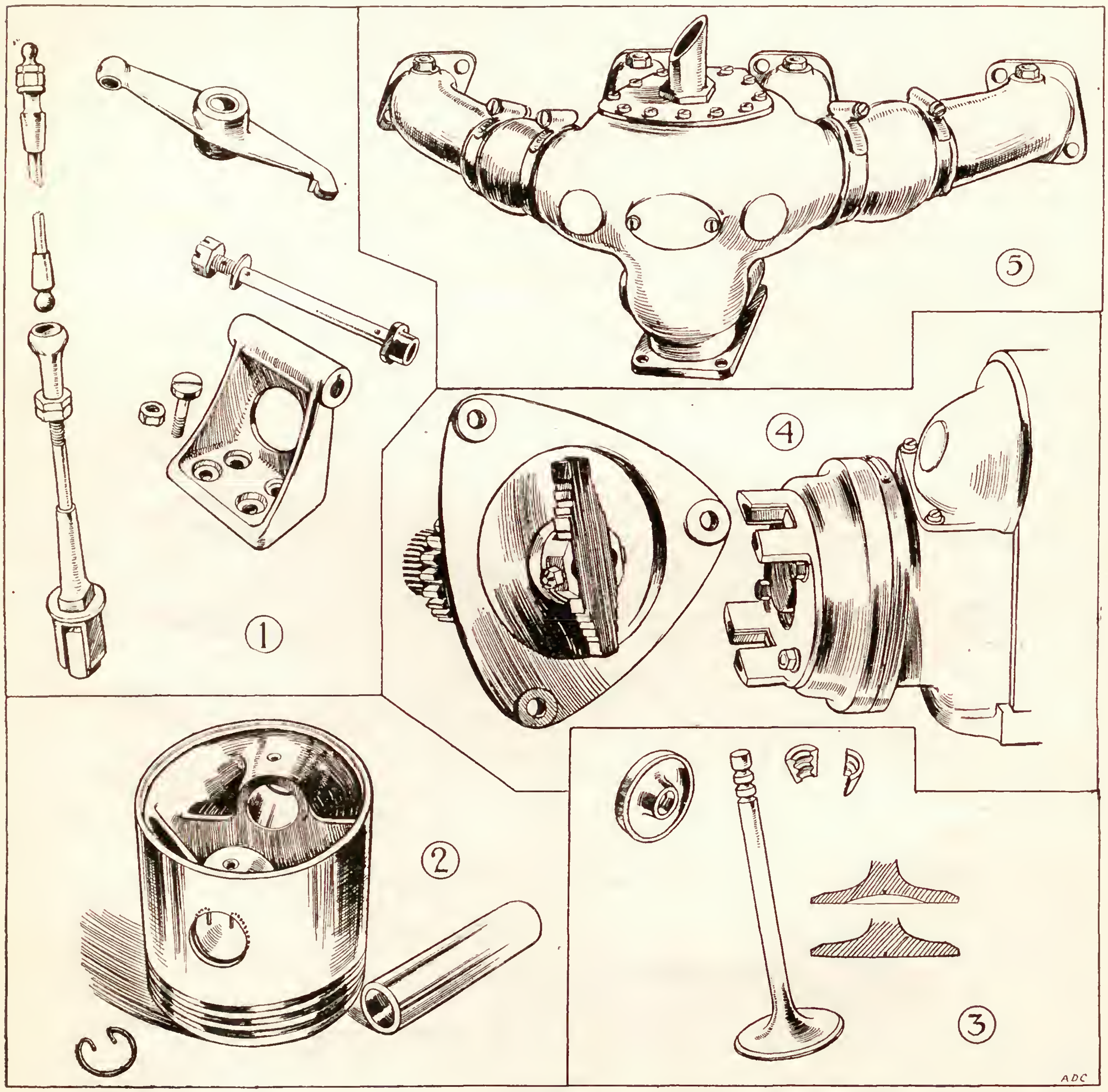




Crankshaft and camshaft of the "Cirrus Mark II" engine, and, above, a cylinder, piston, gudgeon pin and connecting rod.

engine, the Mark II is now available. Incidentally, it should be pointed out that the newer engine passed its Air Ministry type tests some time ago, so that machines fitted with it are eligible for their airworthiness certificate.

A detailed general description of the Mark II "Cirrus" is scarcely necessary in view of the fact that it is, with a few exceptions, identical with the older model, and, in fact, will fit the standard engine bearers of the Mark I, so that for use in machines hitherto fitted with the original "Cirrus" the substitution of the new model is a very simple matter indeed.



["FLIGHT" *Copyright Sketches*

THE "CIRRUS MARK II": Some constructional details. In 1 are shown details of the mounting of the rocker spindle, the adjustments of the push rods, and the arrangement for Tecalemit lubrication of the rockers, &c. 2 shows a piston with piston rings, gudgeon pin and circlips. Details of the valves are shown in 3, the cupped valve being the inlet. The flexible magneto drive is illustrated in 4, while 5 shows the somewhat unusual induction manifold. This is exhaust heated, and the two outer branches are flexibly connected to the fixed centre portion by short lengths of rubber pipe secured by "Jubilee" worm-drive clips.

The four air-cooled cylinders are generally similar to those of the older engine, but are slightly larger to the extent that their bore has been increased from 105 mm. to 110 mm. The stroke remains as before, 130 mm. The cylinder barrels, with their fins, are of cast iron, while the cylinder heads are of aluminium, and are held down by four long bolts to the top of the crankcase. The joint between the head and the cylinder is of the metal-to-metal type. A small change has been made in the shape of the cylinder-head casting, which results in a much simpler job. The rocker arm brackets, which were cast integrally with the head in the older model, are now a separate piece in the form of a Duralumin forging, bolted to the head. A free air passage between the valve domes is thus obtained. The two valves in each cylinder are placed in a very "clean" combustion chamber, as the view of the inside of a cylinder head will show. They take their seats, not on steel valve seats, as in the Mark I, but on phosphor-bronze seats expanded into place in the head casting and held in position by the expanding only, no other form of locking of the seats being provided.

The valves are operated by push rods from the camshaft located inside the crankcase. Duralumin tubes are used for the push rods, and two adjustments are provided in each push rod, one set at the top and another a short distance

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It is used in twenty different countries outside Great Britain.

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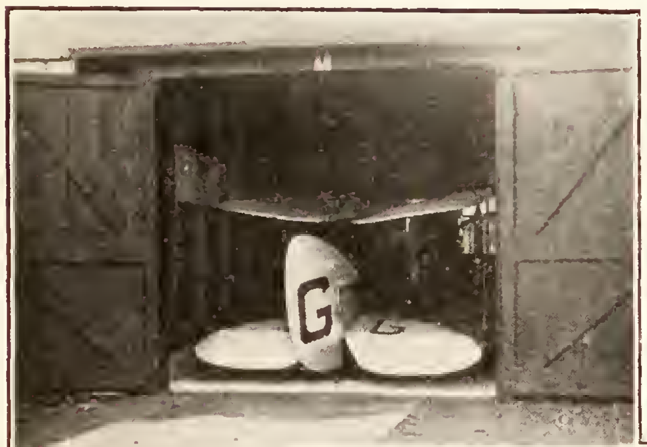
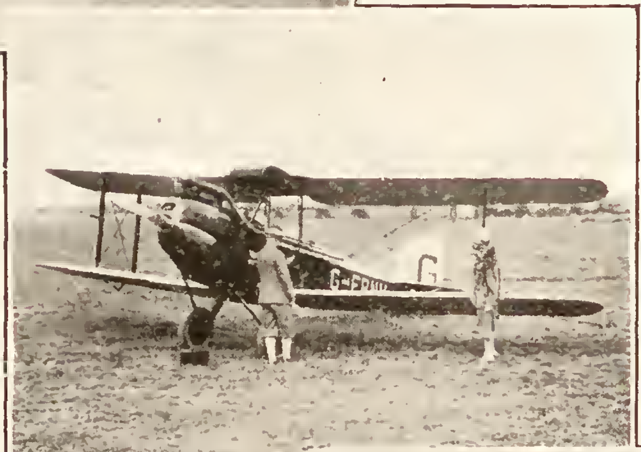
THE DE HAVILLAND "MOTH"

As simple to run as a small car—an entirely practical vehicle, embodying every comfort for passengers and ample space for luggage, easy controls, extreme robustness and a travel capacity of 70-80 miles an hour in any weather; cheaper to maintain than a car. Price, with 27-60 h.p. "Cirrus" engine, £795, and with 30-75 h.p. "Cirrus," £830, ready to fly away from Stag Lane Aerodrome.





["Flight" Photos.]

The illustrations show (1) The Moth, wings folded, in an ordinary garage. (2) The wings spread for flight—the Owner-Pilot can spread or fold the wings with ease in a minute or so. (3) Embarking for the journey—the Moth will fly over 250 miles without refuelling. (4) The start—you need no special clothing and you are efficiently protected from the weather. (5) Well away and showing a clean pair of heels to cars and trains.

Write for Illustrated Catalogue to:—

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Telephone: COLINDALE 6160. *Telegrams:* "HAVILLAND, EDGWARE."

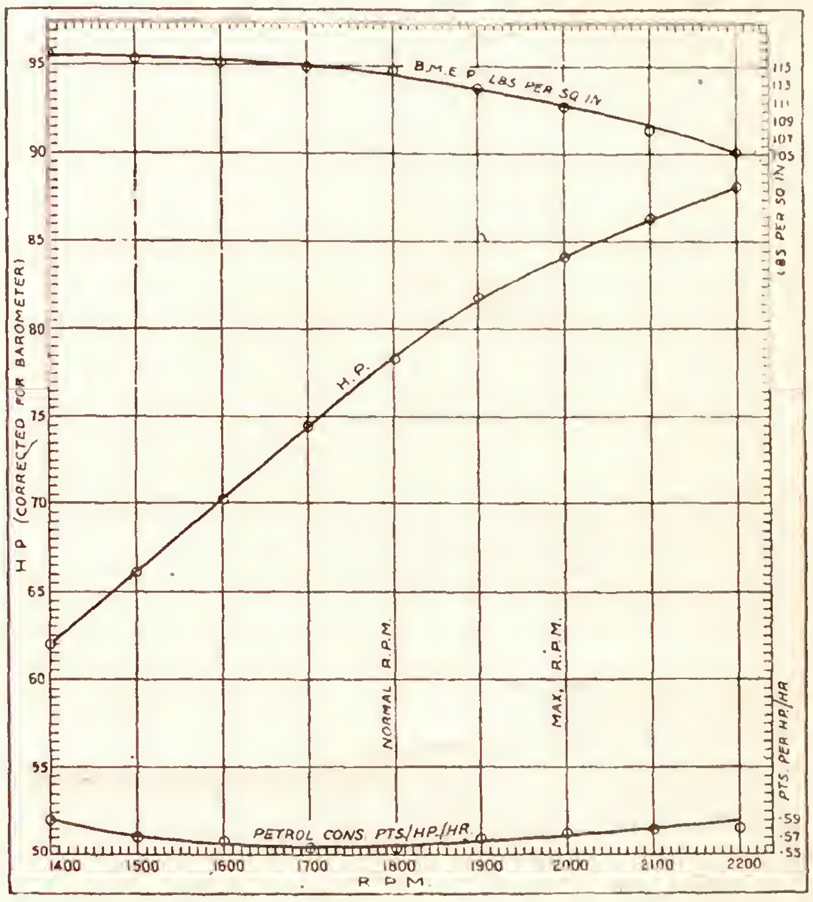
above the crankcase. The upper adjustments can thus be reached without removing the engine cowling, and it is not until a very great amount of "play" has to be taken up that it becomes necessary to make use of the lower adjustments. Ball and socket joints are used between push rods and rocker arms, and small Tecalemit lubricating cups are fitted which ensure the lubrication of the rocker arms.

The crankshaft differs slightly from that of the older engine, and the thrust is now taken on a deep-track ball bearing housed in the front of the crankcase. By a very slight difference in the machining of this housing the engine can be used as a pusher. As in the older model, lubrication is partly by pressure pump feed and partly by splash, the crankcase having an oil sump of large capacity from which the oil is forced, by a submerged pump, to the main bearings and splashed to the gudgeon pins and cylinder walls. The aluminium pistons have a slightly different ring arrangement from those of the Mark I engine, the three rings now being at the top of the piston, with the lower ring acting as a semi-scraper ring. The connecting rods are Duralumin forgings of H-section, with plain white-metal bearings for the big ends, and the gudgeon pins taking their bearing direct on the Duralumin of the small ends. The gudgeon pins, incidentally, float in the piston walls and are held in place by circlips.

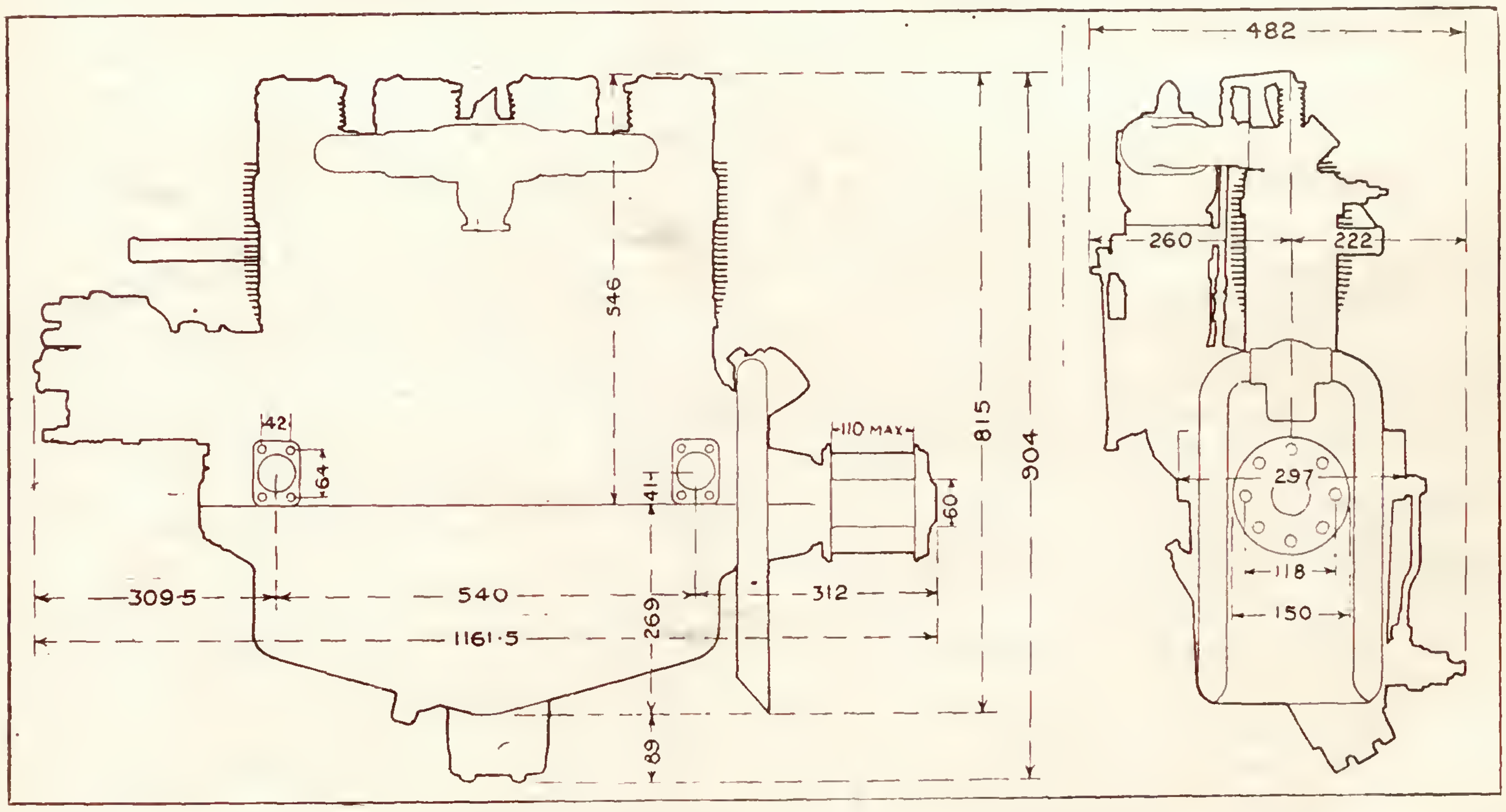
The induction system of the "Cirrus" Mark II is slightly different—or, rather, the manifold itself is of a different shape—and is supplied from a dual carburettor, one induction passage supplying the two inner and another the two outer cylinders. Exhaust heating of the induction manifold is provided.

As regards the running characteristics of the Mark II "Cirrus," the accompanying power and consumption curves show that at the normal speed of 1,800 r.p.m. the engine develops about 78·5 h.p., while at the maximum permissible speed of 2,000 r.p.m. the power is just over 84 h.p. With a compression ratio of 4·9 to 1 the fuel consumption is very low, just over 0·56 pints per horse-power per hour at 1,800 r.p.m., and 0·575 pints per horse-power per hour at 2,000 r.p.m. As the normal speed is sufficiently low to give good propeller efficiency, the simplicity of the direct drive used is obtained without sacrifice. Incidentally, it should be mentioned that the tests to which these curves refer were run on "Shell" aviation spirit without the addition of benzol, while the lubricant used was Castrol "R."

Further particulars of the "Cirrus" Mark II engine may be obtained upon application to A.D.C. Aircraft, Ltd., Regent House, 89, Kingsway, London, W.C. 2.



The "Cirrus Mark II" Power and consumption curves.



The "Cirrus Mark II" engine: This installation diagram should enable aircraft designers to see how the engine will "fit into" their designs. The engine fits the same bearers as those used for the Mark I.

* * *

Bedford Balloon Accident Sequel

Arising out of the balloon accident at Kempston, near Bedford, on August 3 last, when Capt. E. T. Willows and four passengers were killed, proceedings, under the Air Navigation Consolidation Order of 1923, and the Air Navigation Act of 1920, were taken against C. G. Spencer and Sons, Ltd., of Highbury, for allowing a balloon to be flown without special permission, and without it being certified as airworthy. The Magistrates convicted on both summonses. In the case of the failure to have a permit they imposed a fine of £100. With regard to the failure to have an airworthiness certificate, they agreed that the phrasing of the temporary certificate was ambiguous, and imposed a penalty of £50. The costs were fixed at 30 guineas. They declined to state a case, but agreed to accept a notice of appeal at Quarter Sessions.

SOME "MOTH" STATISTICS

One of the outstanding events in civil aviation of recent years has been the instant and widespread popularity of the De Havilland "Moth" low-power two-seater. From the very first this machine was "right," although minor improvements in constructional details, mainly concerned with robustness under hard wear, have naturally been effected. In paying a tribute to this machine, one should not overlook the part played in its success by the "Cirrus" engine, with which it is equipped as standard. This engine has established a reputation for reliability such as has rarely been attained by an aero engine, and has thus contributed a great deal towards the popularity of the "Moth." Recently some statistics have become available which give "chapter and verse," as it were, for the reasons of the success of the "Moth," and we think our readers will find these interesting reading.

It is estimated that "Moths" have flown, in various parts of the world, an aggregate distance of some 580,000 miles, representing about 8,280 hours' flying. No less than 135 *ab initio* pupils have qualified on "Moths" for their Royal Aero Club certificates and Air Ministry "A" licences. This number of pupils, which may appear small in proportion to the number of flying hours, is, of course, due to the fact that the light aeroplane clubs have many members for each machine in use, and that thus there are probably several hundred partly-trained pupils who are ready to pass their flying tests. The figures include also the flying done by a number of private owners. *No serious accident on a "Moth" has ever been recorded.*

The De Havilland School of Flying was equipped with "Moths" in October, 1925. In just over one year 46 *ab initio* pupils have been trained, the average time taken to advance to the "solo" stage being seven hours on dual instruction. It has been found that after 12 hours' solo, or a total of 19 hours in the air, pupils require only about one hour's dual instruction on D.H.9 machines fitted with Armstrong-Siddeley "Jaguar" engines.

As regards the flying qualities of the "Moth," these cannot well be tabulated and shown as statistics, but experience has shown that these machines, although quite stable and "docile," represent quite accurately the service types, the controls being generally similar to those of the more powerful machines. A pupil who can successfully land a "Moth" can master the service type in a very short time.

From the point of view of cost of running and maintenance the "Moth" appears to be equally satisfactory. Figures carefully compiled from records of actual flying experience over one year show that, on average school work in training officers of the R.A.F. *ab initio*, candidates for the Auxiliary Air Force, and private pupils, the cost of replacements was extremely low, being 2*s*. 2½d. per hour for engine replacements, and 2*s*. 1*d*. per hour for aircraft replacements. On a mileage basis the total cost of machine and engine replacements is equivalent to 0·7*d*. per mile.

Two "Moths" of the London Aeroplane Club completed 470 hrs. 20 mins. flying between August 20, 1925, and February 8, 1926, for a total replacement cost (for machine and engine) of £21 11*s*. 2*d*., which corresponds roughly to 0·19*d*. per mile.

These figures refer, of course, to the standard "Moth" with "Cirrus Mark I" engine. "Moths" can now be obtained fitted with the new "Cirrus Mark II," which gives the machine a slightly better performance, as follows: Top speed, 96 m.p.h. (154·5 km./h.); stalling speed, 41 m.p.h. (66 km./h.); rate of climb at ground level, 650 ft./min. (33 m. per sec.); climb to 5,000 ft. (1,525 m.) in 9·3 mins. Range at cruising speed, 4 hrs. The petrol consumption of the "Cirrus Mark II" under average conditions is about 4·25 gallons per hour (19·3 litres per hour), while the oil consumption is 1 pint per hour (about 2 litres per hour).

AIR MINISTRY NOTICES TO AIRMEN

Index.—October 15, 1926

It is notified that the Index dated April 1, 1926, is cancelled and a new one substituted therefor:—

This enumerates the Notices to Airmen cancelled, including (*a*) Notices which are cancelled through incorporation in the Air Pilot or Air Pilot Monthly Supplements.

(*b*) Notices notified as cancelled previously or which need no longer be retained.

Note.—Among the Notices in class (*b*) are certain Notices which were issued to call attention to Orders in Council. The cancellation of such Notices in no way affects the Orders in force.

Also the Notices to Airmen both General, Home and Foreign, which will remain operative until further notice.

To facilitate reference an indication of the principal contents of a Notice is given if this is not made clear by the title. If part of a Notice has been cancelled this also is indicated.

Croydon: Air Light. Manston: Landing Regulations

1. *Croydon.*—The cone-shaped air light at Croydon aerodrome will be dismantled shortly. The light will cease to function on the 18th inst. This light will be replaced by a Neon air light, particulars of which are as follows:—

Position.—In S.W. corner of Croydon aerodrome, and on W. side of the main road. Lat. 51° 21′ N.; Long. 0° 08′ W.

Nature and Character of Light.—1 red, occulting, 2 secs. (TC2r13$\frac{7}{10}$.)

Visibility in Clear Weather.—45 miles.

English Candle Power.—13,700.

Description of Structure.—16 Neon tubes, each 20 ft. long, mounted at a small angle to the vertical on a steel tower erected on a disused chimney.

Description of Light.—Situated approx. 280 ft. (85 metres) above sea level; approx. 46 ft. (14 metres) above ground level. The light is only operated when due notice that an aircraft may arrive between sunset and sunrise has been given to the C.A.T.O. Croydon. A red occulting light is exhibited every 2 seconds as follows:—

Light 1 second; eclipse 1 second.

2. *Manston.*—Pilots approaching Manston aerodrome with the intention of landing must not fly across the roads which intersect the aerodrome at a height below 50 ft. (15 metres), owing to the possibility of danger arising to the general public when these roads are crossed at a low altitude.

(No. 67 of 1926).

Air Navigation Directions, 1926 (A.N.D.6)

1. The Air Navigation Directions, 1922 (A.N.D.3), and amendments thereto (A.N.D.3 A-F) are about to be superseded by a consolidated and revised edition, incorporating numerous modifications, entitled the Air Navigation Directions, 1926 (A.N.D.6).

2. These new Directions will come into force upon November 15, 1926, and will be obtainable on and after November 6, 1926, from the Sales Offices of H.M. Stationery Office or through any bookseller, price 6*d*. net.

(No. 72 of 1926.)

Examination for Air Navigators

An examination for 1st and 2nd Class Air Navigators' licences will be held at the Air Ministry, Gwydyr House, Whitehall, on Monday and Tuesday, December 6 and 7, 1926.

Application forms, the syllabi, and conditions of examination, may be obtained on application to the Secretary, Air Ministry (C.A.2), Gwydyr House, Whitehall, London, S.W. 1.

Formal applications to sit at this examination should be received at the above address not later than November 29, 1926. Candidates should give, with their applications, full details of any qualifications and experience they already possess.

Before a licence can be issued, candidates will have to pass a medical examination at the Central Medical Board, 5-6, Clements Inn, London, W.C.2. Arrangements can be made for this examination to take place on December 8, 1926, if candidates make early application to be examined on that day.

(No. 73 of 1926.)

NOTICE TO GROUND ENGINEERS

Separating Clips for Streamline Bracing Wires

It is notified a case has occurred in which the brass clip, acting as acorn between duplicate streamline wires, has worn considerably into one of the wires so as to render the wire unserviceable.

Immediate action should be taken to examine the wires under all such clips to ascertain whether any wear has taken place. Damaged wires should be replaced forthwith.

(No. 3 of 1926.)

FROM THE FOUR WINDS

Hamburg's Growing Air Traffic

IN so far as actual air traffic is concerned, Hamburg is now Germany's leading air-port. Whereas in August, 1924, the traffic totalled 279 planes, carrying 352 passengers and 3,822 tons of mails and freights, in August last, it totalled 952 planes, carrying 2,862 passengers, and 37,219 tons of mails and freights. The traffic is chiefly that of the main international air routes in which German and foreign lines participate.

Of these figures for August last, 685 of the machines, 1,681 passengers, 18,624 tons of freight, and 7,620 tons of mails, formed the German share of the traffic, the remainder being foreign.

The 1926 Coupe Breguet

THIS year's competition for the Breguet Cup has been won by Adjutant Duroyon on a Potez XV, with 400 h.p. Lorraine engine. His speed was 202·651 km. per hour (125·6 m.p.h.).

Forced Landing in Street

A GERMAN aeroplane flying very low over Hamburg some time ago developed engine trouble, and the pilot had to alight in the street in front of the Borgweg railway station. No one was injured, and the only damage done was to the undercarriage of the machine.

Rome-Berlin Air Line ?

FROM Germany it is reported that negotiations are proceeding between the Italian Aero Lloyd and the German Air Hansa for the establishment of an air service between Rome and Munich via Bologna and Milan. Should the new line come into being, it will link up by air line the German and Italian capitals.

The Paris Aero Show

THIS year's Paris Aero Show promises at last to be of a really international character. In addition to the usual French exhibits, we understand that Germany will be represented by Junkers and possibly Udet, Italy by the Pisa works, manufacturing Dornier machines, Czechoslovakia by Milos Bondy and Co., and England probably by two or three firms.

An Australian Flying Record

CAPT. JOHNSTONE, of the Royal Australian Air Force, recently flew from Long Reach to Melbourne, a distance of 1,100 miles, in 10 hours. This is claimed to be a record for a one-day flight in Australia.

Deputy Director of Civil Aviation

A NEW post has been created at the Air Ministry—that of Deputy Director of Civil Aviation, which may be said to replace the post of Deputy Director of Air Transport, now abolished. Mr. F. G. L. Bertram, who has been associated with civil aviation matters for some years past, has been appointed to this new post.

Coste and Rignot Carry On

THE French pilots, Lieut. Coste and Capt. Rignot, who recently put up a record non-stop flight from Paris to Djack (or Jask) on the Persian Gulf, continued their flight eastwards on November 1 and flew to Karachi. They set out again next day with the intention of making a non-stop flight to Calcutta. Their Breguet XIX A2 (500-h.p. Hispano-Suiza) passed over Allahabad that afternoon, but did not reach Calcutta as expected, and some anxiety was felt as to their safety by the gathering that waited to welcome the airmen at the Dumdum Aerodrome. However, they turned up safely on November 3, and the next day they made a non-stop flight of 9 hours to Delhi on their return flight.

Japanese Honours for U.S. World Flyers

THE Japanese Government has informed the U.S. War Department that it intends to award decorations to the six American airmen who flew round the world in 1924.

A Franco-German Air Agreement

THE French and German Governments have concluded an agreement whereby individual flights by private aeroplanes of either country may be permitted over territory of the other country without previous authorisation.

Australian Pacific Flight

GROUP.-CAPT. WILLIAMS, who is carrying out a survey flight of the South Pacific Islands on a D.H.50 seaplane, reached Tulagi, Solomon Islands, on November 5. On reaching Roviana later, however, a leak developed in the engine water jackets, and as only a temporary repair can be made, it is feared that the flight will have to be abandoned and Capt. Williams will fly back to Australia.

Russo-German Airways Contract

A CONTRACT was signed in Moscow on November 6 regarding the immediate development of the Beru Luft, or German-Russian Airways Co., whereby this company will in future work the services between Berlin and Moscow instead of between Koenigsburg and Moscow.

Basel-Frankfurt Air Service

AN experimental winter air service between Basel and Frankfurt has been opened. It is a daily service, in both directions, and will remain in operation until next March.

A North Sea Air Route

PLANS for a North Sea route, probably between Hamburg (connecting Oslo) and Harwich or Felixstowe, is under consideration, the service to be put into operation early next year.

Aerial Map of Delaware State

THE 20th Photo Section at Langley Field, Va. (U.S.A.) has just completed an aerial mosaic map of the State of Delaware. Two photographers, Sergt. V. H. Merson and Staff-Sergt. H. L. Chestnutt, were employed on this work, the pilot being 1st Lieut. G. C. McDonald.

A Bolivian Air Crash

A FATAL aeroplane accident occurred near Santa Cruz on November 6, when a Junkers machine, with the Bolivian Consul at Arica and three other passengers, including a woman, on board, crashed. All four passengers, together with the pilot and mechanic, were killed.

Brazilian Atlantic Flight

SEN. DE BARROS, the Brazilian pilot, and his companions, who are attempting a flight from Genoa to Brazil in a Savoia S.55 twin-flying boat, left Las Palmas (Canary Is.), on November 8, *en route* for Porto Praia, Santiago. They had to come down, however, at the island of Fogo, Cape Verde Islands.

Sir Alan Cobham at Albert Hall

A REMINDER to readers that Sir Alan will lecture on his long-distance flights on Saturday at 2.30 and 8.30 p.m.

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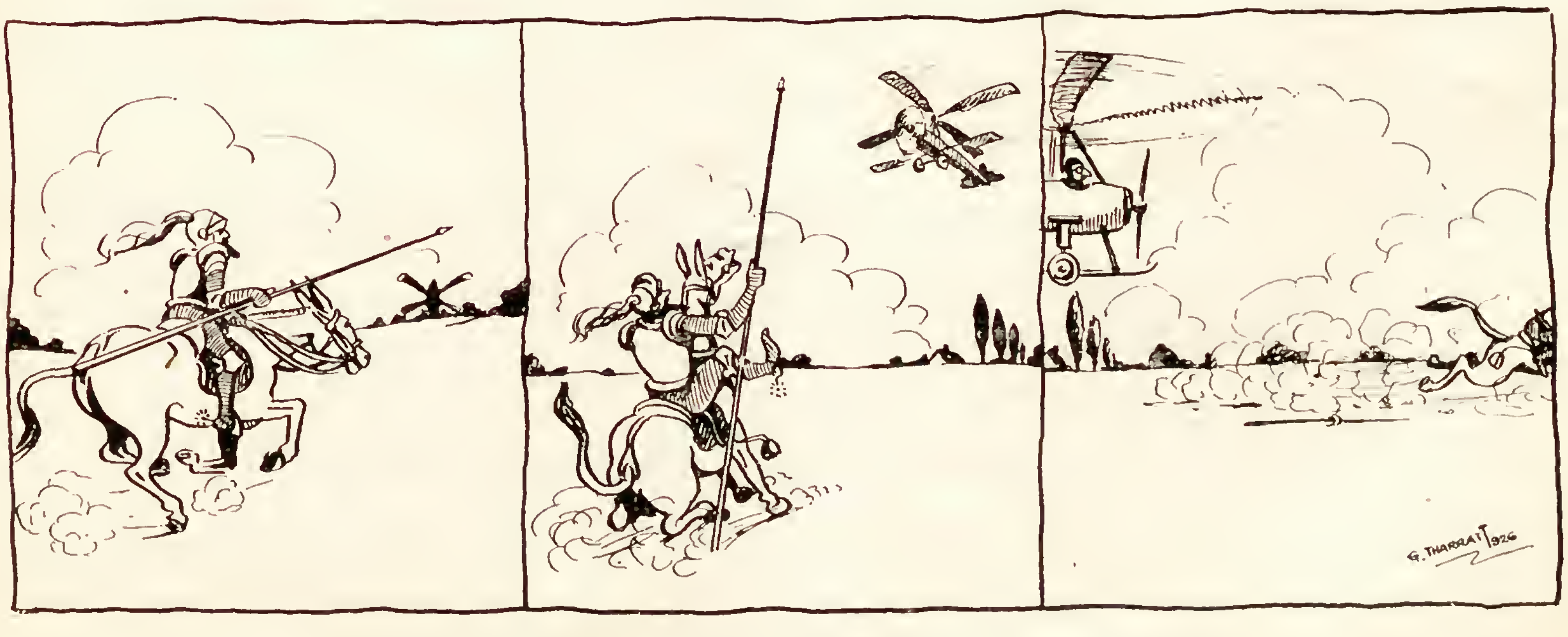

IF DON QUIXOTE LIVED TODAY: The tables turned.

THE EFFECT OF REDUCED INTAKE-AIR PRESSURE AND OF HYDROGEN ON THE PERFORMANCE OF A SOLID-INJECTION OIL ENGINE.

The paper under above title, read by Mr. F. G. Mucklow before a joint meeting of the Royal Aeronautical Society and the Institution of Automobile Engineers on November 4, 1926, was one of very great interest in view of the developments now going on.

In his paper Mr. Mucklow dealt with experiments carried out in the engineering laboratories of the University of Manchester on a Crossley solid-injection oil engine in which small quantities of hydrogen or coal gas were introduced along with the air supply to the engine.

Three series of trials were run with hydrogen, each at a different load, namely, 53·4, 39·4, and 24·4 b.h.p. The maximum amount of hydrogen used was slightly more than 3 per cent. by volume of the air supply, corresponding, at the lightest load, to some 14 per cent. by weight of the oil fuel supply.

Three corresponding series of trials were run using coal gas in place of hydrogen, the maximum volume of gas employed being 5 per cent. of the air supply. At the lightest load, this corresponded to approximately 2·4 times the weight of fuel oil used.

The lecturer arrived at the conclusion that such quantities of hydrogen or coal gas could be used satisfactorily in the type of engine considered. No trouble was experienced due to pre-ignition or other causes, and the engine appeared to run more sweetly when gas was being used.

When running at constant load and speed, the admission of small quantities of gas appeared to cause combustion to take place at a slower rate, giving a lower maximum pressure and more burning down the expansion stroke. The thermal efficiency was in consequence slightly reduced, while the heat losses to exhaust were increased.

* * * *

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The total flying time for the week was 35 hrs. 15 mins. The following members had dual instruction: G. C. Bonner, T. C. Sharwood, F. Clarkson, G. H. Saxon Mills, E. J. B. King, Miss Fletcher, D. H. P. Esler, B. Lester, H. Spooner, M. P. Susman, H. Solomon, L. G. Sykes, Lady Bailey, H. H. Samuelson, E. E. Shaw, Miss O'Brien, A. J. Richardson, R. A. St. John, V. H. Doree, R. L. Preston, E. A. Lingard, W. J. S. McLeod, J. L. Gardner, E. S. Brough, G. H. B. Maddocks.

The following made solo flights: Lady Bailey, L. J. C. Mitchell, W. Hay, W. J. S. McLeod, E. S. Brough, Miss O'Brien, H. Petre, H. Kennedy, E. L. O. Baddeley, N. Jones, K. V. Wright, Sqdn.-Ldr. M. E. A. Wright, Maj. K. M. Beaumont, N. J. Hulbert, D. H. P. Esler, G. H. Craig, A. R. Ogston, G. Terrell.

The following members had joy-rides: E. H. Walker, W. E. P. Johnson, G. H. Craig, Miss Spooner, G. F. Wilson, Mrs. McKay, R. G. Gallien.

On Sunday, November 7, K. V. Wright passed the tests for his aviator's certificate. On Wednesday, November 3, R. L. Preston, about to start on a solo flight, taxied into a ditch, causing slight damage to G-EBNP.

The Hampshire Aeroplane Club

Report for week ending October 28:—Total flying time, 12 hrs. 26 mins.; instruction flying, 5 hrs. 40 mins.; passenger flying, 30 mins.; solo flying, 6 hrs. 16 mins.

The following members received instruction flights: Messrs. Southcliffe, 1 hr. 5 mins.; Bailey, 1 hr. 10 mins.; Lieut. Graham, R.N., 1 hr.; Miss Home, 45 mins.; Messrs. Bound, 30 mins.; Cooper, 25 mins.; Westbrook, 15 mins.; Bishop, 15 mins.; Moloney, 15 mins.

Mrs. C. B. Fry received 30 mins. joy-ride.

The following members flew solo: Flying Officer Clarkson, 3 hrs. 55 mins.; Perfect, 53 mins.; Lieut. Musselwhite, 46 mins.; Lieut. Kennedy, R.N., 30 mins.; Mr. Fry, 12 mins.

Report for week ending November 4:—Total flying time for the week, 6 hrs. 25 mins. Instruction flying, 3 hrs.; passenger flying, 1 hr. 42 mins.; solo flying, 1 hr. 43 mins.

The following members received instruction: Messrs. Shepherd, 30 mins.; Bound, 25 mins.; Dickson, 25 mins.; Stokes, 25 mins.; Appleford, 20 mins.; Cooper, 15 mins.; Courtney, 15 mins.; Rumble, 10 mins.; Westbrook, 10 mins.

The following members received joy-rides: Miss Fry, Miss Manning, Capt. Lamplugh, and Mr. Stanford.

The soloists were: Messrs. Simmonds, 40 mins.; Perfect, 20 mins.; Fry, 18 mins.; Rumble, 10 mins.; Bowen, 5 mins.; and Flying Officer Clarkson, 10 mins.

Lancashire Aero Club

Report for week ending October 29:—Total flying time, 20 hrs. 5 mins., made up as follows:—

Dual with Messrs. Brown and Cantrill: Messrs. Blagden, 1 hr. 35 mins.; Hindley, 1 hr. 15 mins.; Abdalla, 1 hr. 10 mins.; Leigh and Costa, 1 hr. each; Twemlow and Gattrell, 50 mins. each; Anderson, 40 mins.; Shiers, 30 mins.; Barnes, 30 mins.; Whittaker, Cohen, Nelson, Dobson and Miss Brown, 20 mins. each; Miss Emery, 15 mins.; Mr. Michelsen, 15 mins.; Messrs. Goodyear and Hardy, 10 mins. each.

Solo: Messrs. Costa, 3 hrs. 20 mins.; Hardy, 30 mins.; Lacayo, 20 mins.; Agar, 20 mins.; Leeming, 10 mins.

Joy-rides with Messrs. Brown, Cantrill and Leeming, 1 hr. 30 mins. Tests, 1 hr. 30 mins.

The trades union spirit has been manifesting itself in the club during the past few weeks. Two flying members, who between them carry most of the joy-ride passengers on Sunday afternoons, have entirely different styles of pilotage. One likes to float about the atmosphere in a series of gentle cart-wheels and half-rolls, ending up with a spinning nose-dive and a side-slip landing. The other (who has both a strong head and a strong stomach) is at his happiest when doing a vertical tail-slide stall, or stirring the porridge while on the top of a loop, both of which No. 1 pilot loathes. An agreement has therefore been concluded between them whereby any joy-riders asking for "fore-and-aft" stunts shall be handed over to No. 2 pilot, while all those requiring "lateral" stunts shall go with No. 1 pilot. One may add that a suggestion by the latter to the effect that "hoppity-hoppity" landings might appropriately be considered as "fore-and-aft" stunts was met with dignified silence.

Report for week ending November 6:—Total flying time, 21 hrs. 45 mins. made up as follows:—

Dual with Messrs. Brown, Cantrill, and Scholes: Messrs. Blagden, 1 hr. 55 mins.; Twemlow, 1 hr. 20 mins.; Cohen and Hindley, 1 hr. 5 mins.; Abdalla and Newton, 45 mins.; Dobson and Shiers, 40 mins.; Wood and Miss Brown, 35 mins.; Hardy, 30 mins.; Moore, 25 mins.; Nelson, 25 mins.; Miss Emery, 25 mins.; Messrs. Crosthwaite and Anderson, 20 mins.; Goodyear, Dickinson, Powell and Forshaw, 15 mins.; Hardy, Lacayo, Pitman, Williams and Hargreaves, 10 mins.

Solo: Messrs. Michelson, 1 hr. 10 mins.; Costa, 45 mins. Agar, 25 mins. Williams, 15 mins.

Joy-rides.—With Mr. Leeming: Messrs. Colwell, 30 mins.; Swindells 15 mins. With Mr. Lacayo: Messrs. Benson, 1 hr. 35 mins.; Hartley, 30 mins.; Sivery, 30 mins.; Nelson, 20 mins. With Mr. Williams: Mr. Cantrill, 10 mins. Tests, 1 hr. 30 mins.

The weather has been normal throughout, with gales, rain, and fog predominating in turn.

Midland Aero Club, Ltd.

Report for week ending November 6.—Owing to very bad weather flying was only possible on three days. Total flying time, 4 hrs. 5 mins.

The following members were given dual instruction: J. Brinton, C. Fellows.

The following members made solo flights: G. V. Perry, J. Brinton, E. J. Brighton.

Newcastle-upon-Tyne Aero Club

Mr. Parkinson is still enjoying his rest from flying by spending his time at the aerodrome superintending the flying of members of the club.

It is not yet decided who shall take him up for "a few landings" on the completion of his four weeks on the ground, but no doubt the matter will have to be considered shortly. There should be a good attendance of members who only fly occasionally to witness this event.

The total flying time for the week ending November 7 was 14 hrs. 40 min. 4 hrs. 45 mins. of this being flown on Sunday.

The following members flew solo and with passengers: Lord Ossulston with Miss Leathart, Mr. Wardill and Mr. Mathews; Mr. N. S. Todd with Mr. Stawart, Mr. Bruce and Mr. Turnbull.

Mr. Irving put in a lot of solo flying, and will carry out the tests for his licence as soon as weather conditions permit of the height tests. Mr. Mathews has also flown frequently alone.

Dr. Dixon flew with Mrs. Marcks and Mr. Phillips. Mr. Phillips took charge of the machine on some occasions. As these members always fly together, it is seldom certain who is actually the pilot.

Mr. Heppell flew with Mr. Kennedy as passenger. Mr. Kennedy also flew with Mr. Ellis. Mr. C. Thompson took up Mr. Osborne and Mr. Thompson.

Mr. H. Ellis completed his tests on November 1. It was a very clear but cold day, and Mr. Ellis flew well and his judgment for landings, etc., was excellent.

Yorkshire Aeroplane Club, Ltd.

Report for the week ending November 5.—Total flying time 7 hrs. 55 mins. as follows:—

Solo flying, 1 hr. 30 mins.; dual instruction, 6 hrs. 5 mins.; and joy rides, 20 mins. Flying was only possible on three days out of the week, 24 flights being accomplished in all.

The following members flew solo: Messrs. Dawson, L. S. Wood, Lax and Watson. The following were given dual instruction: Messrs. Batcock, Brown, Dawson, L. S. Gratwick, Harvey, Mann, Oglesby, Watson, Wilson, Captain Beaumont and Miss Woodhead.

In spite of the weather conditions Messrs. Watson and Dawson were launched solo during the week. Both put up a very good show, and should develop into really useful pilots. Miss Woodhead and Mr. Mann will shortly be launched.

Mr. Rimmer has now left us, the more hurriedly because Captain West took him up on "LS" on Saturday and suffered a forced landing with a choked jet. Mr. Rimmer, a little distraught, got out of the machine, went back to the aerodrome, flew away in his Avro, and has not been seen since.

Mr. Wood has done one loop. The significance of this lies in the fact that he did not, as hitherto, inadvertently perform a second loop while pulling out of the first.

We wish to offer our most hearty congratulations and good wishes to Messrs. Stack and Leete of the Lancashire Club on the very difficult and sporting trip that they are taking on. We are particularly interested in this venture as we realise we are supplying equipment for the trip to the extent of one wheel and one cylinder head, which the most urgent personal appeals have failed to produce at Sherburn. However, the thought that our wheel should be well on the way to Karachi reconciles us to the sight of G-EBNN resting in a corner of the hangar with chocks delicately arranged below the axle.

May the seatings stick to the head and the spokes to the rim, and the very best of luck go with them both!

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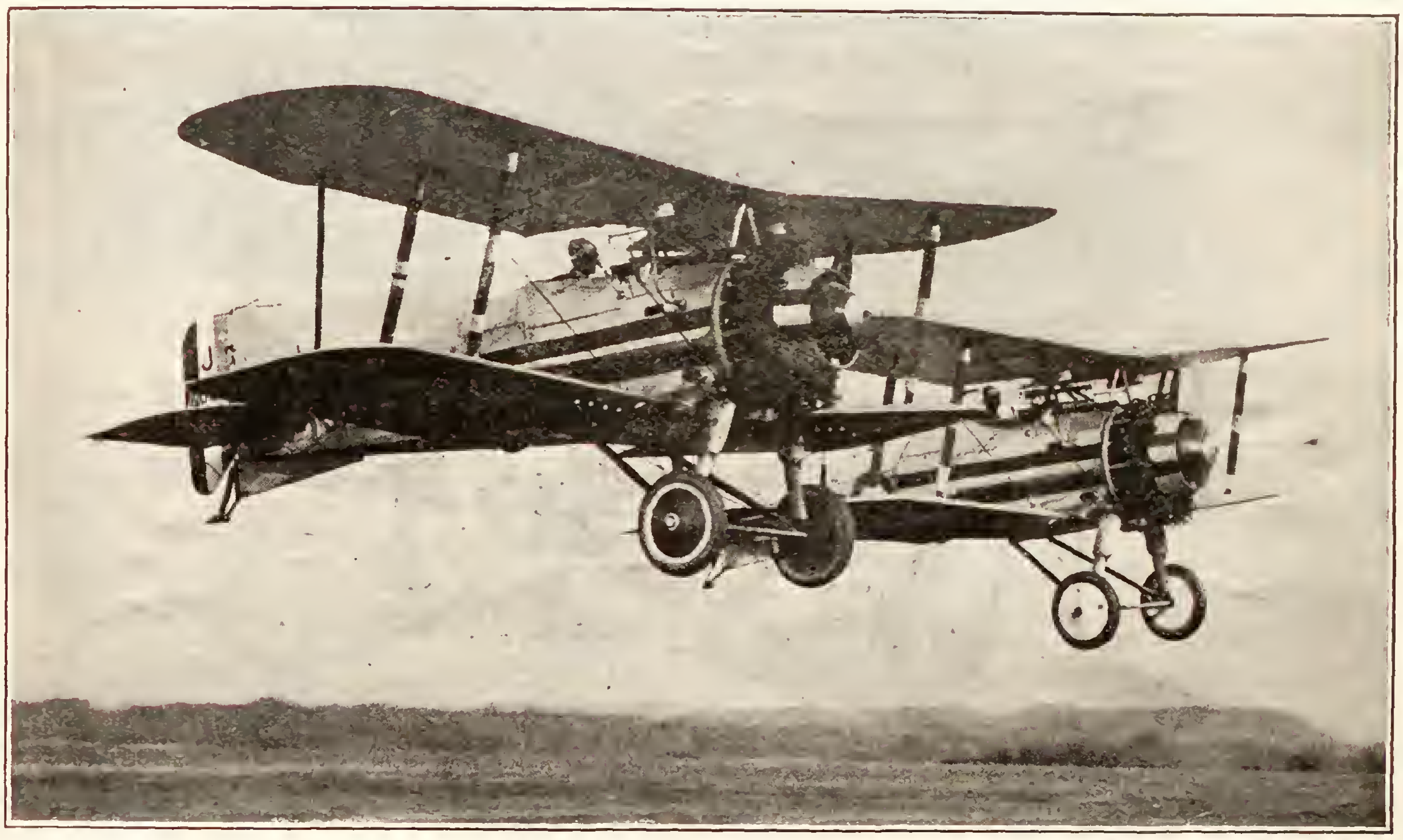

["*Flight*" *Photo.*

TWO "GLOSTER" SERVICE "GREBES" DEMONSTRATING AT THE LYMPNE LIGHT AEROPLANE MEETING.

The "Grebe" can be fitted with
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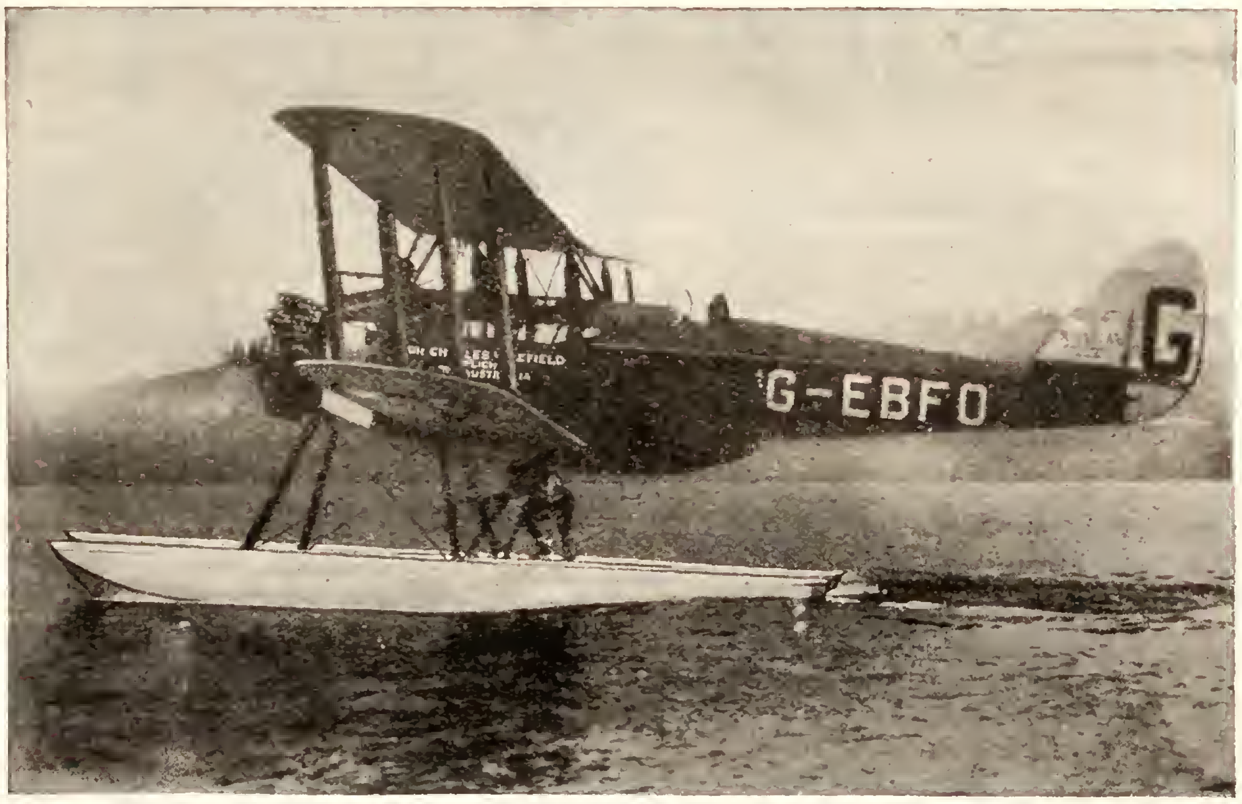
Sir Alan Cobham's flight to Australia.



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were utilised by Sir Alan Cobham on his D.H.50J. machine during his magnificent flight across half the world, flying over many thousands of miles of ocean.

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SURVEYING BY AEROPLANE

Air survey and its importance to the development of the Empire was the *raison d'etre* of a small gathering at the Holborn Restaurant on November 4, the hosts being the directors of Air Survey, Ltd. Col. C. H. D. Ryder, C.B., C.I.E., D.S.O., the chairman of the company and a former Surveyor-General of India, presided.

Col. Ryder in his opening remarks said the whole world had suddenly roused itself—the man in the street, who was, after all, the average citizen, had been stirred by the wonderful flight to Australia and back by Sir Alan Cobham. It was now up to them, the Dominion and other Governments, to take advantage of this, and thereby bring the whole world nearer together and increase more rapidly the untold wealth of its unexplored regions.

In the last few years, with the exception of the Canadian Government, the Air Survey Company, with their numerous successful surveys in the East, had done more, he said, than anyone to further and popularise air survey. But very much more remained to be done. If we wished the British Empire to maintain a supremacy in the air, we must educate the public to the undoubted uses of the aero- and sea-planes.

He claimed to speak with some authority on the matter of surveying, having been a surveyor and explorer all his active life, including five years as head of the survey of India, and he was convinced that surveying from the air had come to stay. In this respect we could use a good slogan : " Half the cost in one-quarter of the time." There were vast tracts of lands, undoubtedly of enormous value, still unmapped, and most assuredly no country could be developed without maps, as they were the very first requirement. Only last week he received a letter from a friend in Canada, in which he said :—

" A larger programme in aerial photography than ever before has been completed. Surveyors, foresters, water power engineers, geologists and, in fact, almost every branch of engineering work interested in the development of this country are now backing aerial surveys as being the fastest and best method of obtaining information on which their work depends."

Continuing, he said, he had spoken upon air survey alone, but there was another development which must come and that was air mail and transport, and he wanted to emphasize that air survey and air transport were as inseparable as Siamese twins. They were now centering their attention upon the air mail and transport side of the question, and felt that they might be up against big odds, but if only companies holding large concessions of lands, big merchant traders, and last—the most important—the various Governments, would come to their aid and assistance, then within the next few years the expansion in trade and commerce by the means of the air would become an epoch in the era of our history.

In conclusion, the charman congratulated and thanked the staff for the splendid work they had done, especially Mr. F. P. Raynham, who had just returned from Borneo after completing two large surveys and who was there today and had joined the board of directors, and Capt. J. Durward, who was now carrying on the good work in the East.

Mr. R. C. Kemp, managing director of Air Survey Co., Ltd., in dealing with what he termed the more neglected branch of aviation, namely, survey by photography from the air, mentioned the survey of the Irrawaddy Delta (1,400 square miles) which saved the Government of Burma an expenditure of £18,000 and three to four years in time, according to an estimate of a Government surveyor. Since 1924 the Air Survey Company had surveyed the South Tenasserim Forests in Burma.

The country had previously been mapped by the survey of India on a scale of 1 in. to the mile, so that all that was required by the forest department was a very complete reconnaissance during which the various forest types were located and their position marked on the maps by trained forest officers, who flew as observers on the company's seaplanes. In order that the results of their reconnaissance might be confirmed, numerous strips of oblique and vertical photographs were run over the area at convenient intervals, from which a more detailed and prolonged study could be made than was possible from the air.

The area covered was approximately 15,000 square miles, and took only three months' flying from four different bases along the Tenasserim coast. For the first time it has been possible to locate where the Nomad cultivators, who " move on " to new ground each season, had burned and cleared fresh jungle as they go, as well as the deserted clearings now in a state of secondary jungle, so that the tremendous extent of forest distraction from this cause could be estimated and steps taken to get it under control.

In the same season the Burma oilfields at Yenangyaung were photographed and rectified prints on a scale of 24 in. to the mile were supplied to the Survey of India for the amplification of detail on the map which they were supplying to the Burma Oil Co.

In 1925 a complete survey party was taken down to Borneo, when 1,400 square miles in the Baram district of Sarawak and Brunei were surveyed in seven months against heavy odds in the form of abominable photographic weather. In Burma, in the fine season, a similar area could have been completed in two or three months. That contract, with its heartbreaking delays and difficulties, taught them much, with the result that, on their next survey, some 2,300 square miles in the Rejang district of Sarawak, under Mr. Raynham's charge, he and his assistant, Mr. Andrews, were able to devise a system which simplified the work and, at the same time, largely overcame the cloud difficulties.

They were now employed by the Federated Malay States on the Survey of the Mangrove forests on their West coast, in addition to one or two smaller contracts for engineers and others. Their next move would be to Bengal, where they would make their first start on air survey in India. Mr. Kemp then detailed the several different purposes for which their surveys had been made, including for forest purposes, town planning, etc.

In addition to these, they were convinced of the utility of air survey on river training, hydrographical surveys on rocky or shoal coasts and rivers, prospecting, railroad and engineering surveys, including hydro-electric and water power, and lastly, all kinds of revenue surveys. He would say that it should not be thought for one moment that air survey was going to supersede entirely the older method and put the surveyor out of business. They could not get on without the ground surveyor, who would, however, have to employ the air methods to increase the scope of his work and keep pace with the demand for developments in new countries. as well as revision of his work in countries already mapped.

The farthermost of their surveys were separated by 3,000 miles or more, as the seaplane flies, and their seaplanes had now operated along the whole of the coast from Rangoon to Singapore, Singapore to Pontianok in Dutch Borneo, via the Dutch Islands of Muntok, and Tangong, Pandang, and from Pontianok to Jesselton in British North Borneo. From the experience gained they had come to the conclusion that air survey and air transport could be best conducted together, especially abroad, for although survey parties operating in the East were to some extent based on London, from where they must draw their supplies, they should also have some form of Eastern depot where overhauls could be continuously carried out, a heavy charge to be borne by the survey parties. Therefore, stores, workshops, personnel, and, in fact, all the facilities at a transport company's main base, could be shared by both survey and transport and the cost divided between them. Their company had decided to go ahead on these lines on a route which had been chosen, partly for its commercial attractions and partly on account of its favourable weather conditions.

Designs for an eight-seater seaplane, with several of which it is proposed to make a start, were well in hand and showed excellent promise. After a period of say 18 months or two years ,when it was likely a larger machine would be required, it was estimated that local traffic and survey or reconnaissance would supply ample demand for the older type, so that there would be no necessity to scrap them.

The postal authorities abroad were apparently anxious and eager for the development of mail-carrying air services, as was evidenced by the interest they had taken of late in the flights by Mr. Raynham and Mr. Vintcent of this company, who carried respectively the first air mail in Sarawak, from Borneo to Singapore, also from Singapore to Port Swettenham and Kuala Lumpur.

The Secretary of State for Air, in speaking to the Members of the Imperial Economic Conference on bettering our Empire communications by air services, said : " As to safety, what better record could there be than the five million miles flown by British Services for four fatal accidents, and the million miles flown in Australia for a single accident ? "

Their company, in a small way, could add to that an interesting record as they had not had a single fatal accident during the operation over 90,000 miles of three seaplanes for three years over coast lines and rivers, without any ground organisation other than that which could be readily improvised by their working parties in a part of the world where aircraft were in most cases, strange to the inhabitants, and which was shortly, they hoped, to be part of the route of one of the midway links between England and Australia.

It was the three years during which this mileage had been covered without a single accident that told, and the people among whom they had worked in the East now expected this reliability from aircraft, whoever they be operated by, a most hopeful sign for the future of commercial airways.

Col. Edwards, C.M.G., who spoke in the unavoidable absence of Sir Sefton Brancker, said the gathering marked a new stage in aerial development, it being the first luncheon to celebrate Air Survey pure and simple, proving that it had got through its teething stage and was well on to adolescence. He believed the air could solve their difficulties of colonisation. In Canada, Australia and our other Colonies it must be realised there were vast regions entirely unsurveyed and unmapped, to which *all* classes—professional or otherwise—*must* have access. The Company had surveyed 600,000 square miles, and made a reconnaisance of 14,000 square miles, and Sir John Eaglesome, the engineer, had told him that had our early engineers only had air services, what vast expenses and time might have been saved in unknown territories. In regard to communications by air, at present we thought in time, not distance—the only thing that mattered and the only thing that brought about time saving was air transport. The amenities of civilisation were thereby brought to the backblocks of our Colonies, rendering life absolutely different in those districts. Col. Edwards instanced the Northern part of Central Australia, which was without any means of communication, consequently, with no womenfolk there, without whom colonisation could not go on. Again, air transport enabled them to get medical aid to those parts in reasonable time, rendering it possible for people to live in those areas who would never otherwise have gone there. In conclusion, he said, infinitely more people had been saved by civil aviation than had ever been killed by aviation.

Lieut.-Colonel J. T. C. Moore-Brabazon, Parliamentary Secretary, Ministry of Transport, said that eight years ago he considered himself one of the greatest experts upon aviation alive, and yet now none here was more profoundly ignorant upon the subject than himself. The Air Survey Co. required, he thought, all the encouragement it could get. When anyone introduced a new thing it was only under the most urgent pressure that the man in the street would support it. By way of instance, he recounted some of the difficulties that had to be overcome by the Air Force in the early days of the war. "Anybody," he said, "might have imagined that photographs of the enemy line of trenches would have been a welcome contribution to the General Staff when an attack was contemplated. But we could not get the staff to accept our photographs, and it was not until General Brancker became a sort of peripatetic picture postcard seller that any impression was made. After the photographs were accepted nobody ever thought of making a map of the enemy lines, and the Royal Flying Corps did a most irregular thing in making maps themselves. I did that, and I was nearly shot at dawn because it was not in the book. Later on the same thing occurred with regard to the interpretation of photographs. There were many things there which one could read if one had experience. The Flying Corps published a book on the interpretation of aerial photographs, and there was another row because that was the business of Intelligence, G.H.Q. That shows the difficulty of introducing a new thing. You who are engaged on aerial survey have got a good thing which you are trying to give to the Governments of the Empire, and although you are not paying a dividend, it is pleasant to see that you are not going into bankruptcy."

Sir Alan Cobham emphasised that aerial survey and transport would be a huge benefit to the country, and it was up to the Governments of the countries concerned to see that this company was adequately supported. That would be no philanthropic move when it was realised that the opening up of the countries by that means would enormously increase the values of the districts served by these air lines, paying the countries 10 times over. But it was necessary to influence public opinion to appreciate that.

General J. H. McBrien (Chief of the Canadian General Staff) mentioned that in Canada considerable progress had been made on both the commercial and military sides of aviation. Through the co-operation of the old ground survey system and the newer aerial methods they were surveying at the rate of about 50,000 square miles a year in Canada. From the military point of view, they were well advanced, and they used British equipment as far as possible in all their aerial work. His Government were anxious in every way to work with Britain in developing this great air work for the general benefit of the Empire.

Amongst the invited guests, besides those already mentioned, were The Hon. M. W. Elphinstone, Sir Francis MacLean, Captain F. Tymms (Air Ministry), Flight-Lieut. H. Edwards (Canadian Liaison Officer), Mr. F. D. Thomson (Secretary, Prime Minister's Department, New Zealand), the Hon. W. J. Higgins, K.C. (Minister of Justice, Newfoundland), the Hon. A. B. Morine, K.C. (Newfoundland), Major C. G. Lewis (Survey of India), Mr. H. Wyndham Jones, Dr. Charles Hose (Council, Government of Sarawak), Mr. J. F. Hunter, Mr. C. Morrell, Mr. H. O. Short, Mr. C. R. Fairey, Mr. Campbell Hart, Mr. Hugh D. P. Francis, the Hon. A. G. Bell, Mr. Laurence Pritchard, Mr. F. P. Raynham, Mr. W. P. Kemp, Mr. J. W. L. Kemp, and Mr. C. Acton Dodds.

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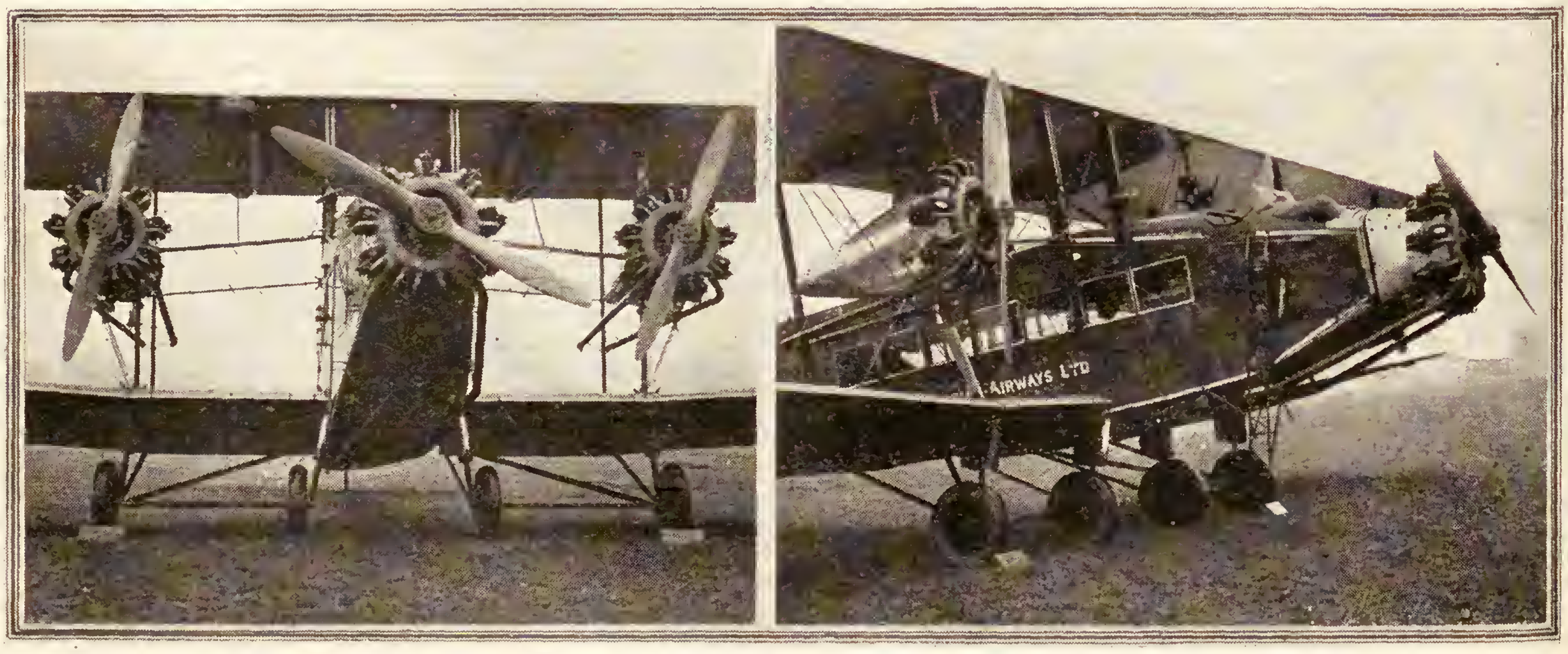
New Ulster Air Squadron Headquarters

THE new city headquarters of the Ulster Air (Bombing) Squadron at Donegall Square South were opened on October 30 by the Duke of Abercorn. The squadron, which is for home defence, is stationed at Aldergrove, and at full strength numbers some thirty officers and two hundred men. It will be under the command of Wing-Commander A. C. Wright, A.F.C.



THE "HAMPSTEAD'S" NEW POWER PLANT: Two views of the three-engined Handley-Page "Hampstead" airliner, for Imperial Airways, fitted with three Bristol "Jupiter" Series VI engines.

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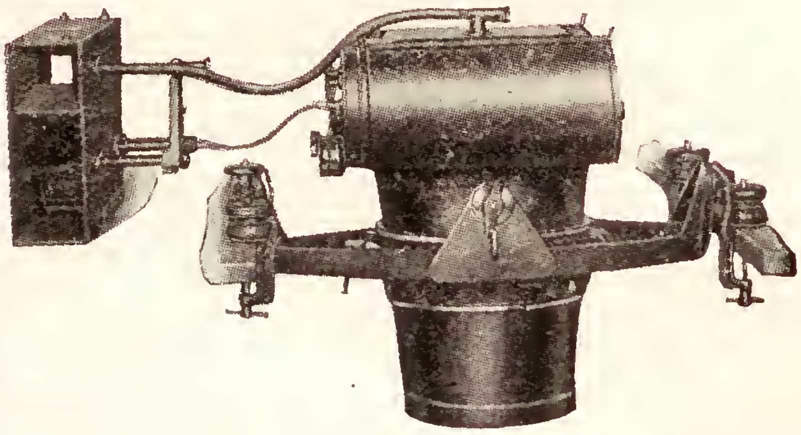

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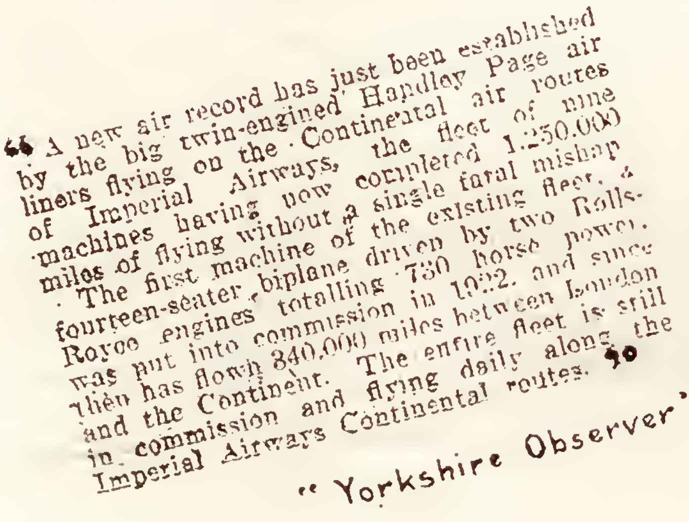

"A new air record has just been established by the big twin-engined Handley Page air liners flying on the Continental air routes of Imperial Airways, the fleet of nine machines having now completed 1.250.000 miles of flying without a single fatal mishap. The first machine of the existing fleet, a fourteen-seater biplane driven by two Rolls-Royce engines totalling 730 horse power, was put into commission in 1922, and since then has flown 340.000 miles between London and the Continent. The entire fleet is still in commission and flying daily along the Imperial Airways Continental routes."

"Yorkshire Observer"

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THE "EAGLE" AERIAL CAMERA

A New British Electrically Operated Outfit

During the last few years remarkable progress has been made in aerial photography, not only as regards its ever-increasing use in all parts of the world, but also in respect to the improvement that has been accomplished in the technical side of aerial photography.

Last week we had the opportunity of inspecting one of the latest developments in aerial cameras, which was demonstrated by the Aircraft Operating Company, at the exhibition of Aerial Survey Work arranged by this company for the delegates to the Dominion Conference. The camera in question is the "Eagle," designed and manufactured by the well-known firm of camera makers, the Williamson Manufacturing Co., Ltd., of Willesden Green, N.W. 10, the sole selling agents for which are Vickers, Ltd., of Vickers House, Broadway, S.W. 1. It may be mentioned here that this apparatus will be used by the Aircraft Operating Company for the air survey contract which they are about to carry out in Northern Rhodesia.

The "Eagle" is designed primarily for air survey photography, and is entirely automatic, being operated and controlled electrically; it can, however, if necessary, be operated by mechanical control or by hand, and the operator can change over from one to the other with the greatest of ease and security. It will take single views, mosaics, oblique or stereoscopic views, and with a single loading of the camera 100 exposures can be made at exactly the right interval of time, so that the consecutive pictures match correctly to form the continuous strip map extending over a distance of from 100 to 500 miles.

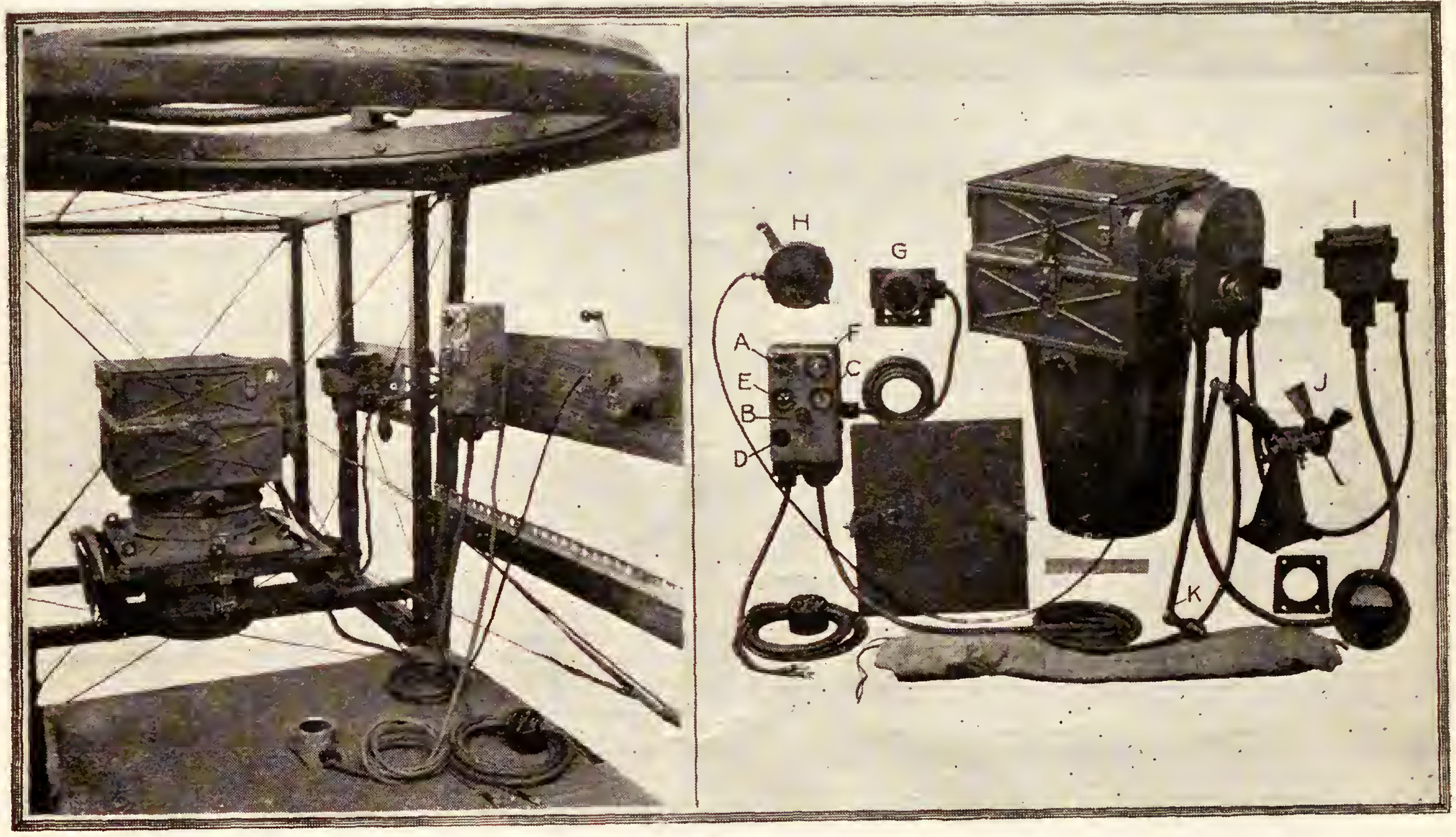
On every photograph is recorded the exact hour, minute and second of exposure, the height at which the aeroplane was flying, the angle of inclination to the ground beneath, a serial number, the scale, type of aeroplane used, date, etc. This camera employs panchromatic film, and takes pictures measuring 7 by 7 in.; each film is 9 in. wide and 65 ft. long, or sufficient for the 100 exposures.

Having thus briefly outlined the main features of the "Eagle" camera, we will now deal with its construction and operation, with the help of the accompanying illustration, which shows the complete outfit as installed in a machine, and the principal component parts.

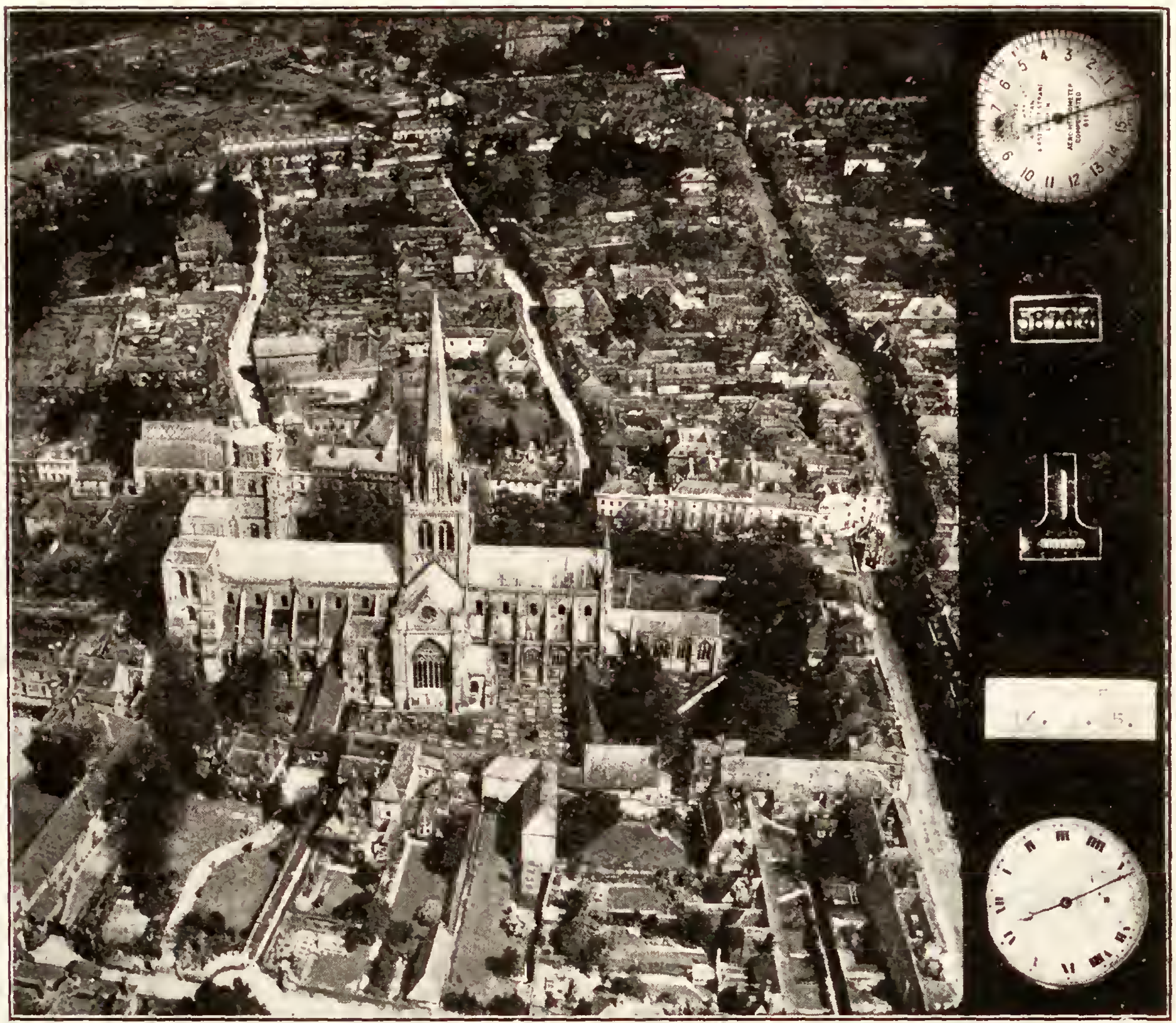
The body of the camera, which carries the lens cone, gear-box, instrument box, focal plane shutter and magazine, is made entirely of aluminium, and is provided with various clips and supports for attaching the different units thereto. A recess is provided in the top of the body to accommodate the film register plate, which is of specially selected glass provided with the necessary collimating points. The film magazine is also made of aluminium, and is attached by spring clips to the camera body. Several spare loaded magazines can be carried in the aeroplane, and can be attached whilst in flight. A separate compartment in the magazine contains the gearing, a counter indicating the number of exposures made, and an indicator which shows at a glance when the film and magazine are functioning correctly. The frame carrying the film spools is provided with a pressure pad, mechanically operated when the film is stationary to hold the film flat in the focal plane at the moment of exposure.

The lens cone is adapted to take any lens from 7 in. to 20 in. focal length, and the focal plane shutter is set to, give an exposure of 1/90th of a second; the standard lenses supplied have an aperture of F.4·5, variations of exposure being made by means of an Iris diaphragm. The actinic value of the exposure at "open" aperture is ample for a good negative on a day of low light value.

This camera, when equipped for electrical control, it is entirely automatic, the only work falling to the operator being to switch on the remote control ("A" in the illustration) on the electrical control unit, which is mounted in the pilot's or observer's cockpit, and gives entire control of the operations wherever the camera may be fixed. This unit consists of a small oblong box connected to the camera and the controls by three separate electric leads. On this box are four dials, a knob, and a push button. One dial is the switch "A," referred to above, which sets the apparatus in motion, causing photographs automatically to be taken at a predetermined interval which is controlled by the knob "B," a dial "C" indicating the period and the number of seconds to pass before the exposure is to be made. When it is required to make a single exposure during the period between



THE "EAGLE" AERIAL CAMERA: Two views of the latest British aero camera, which is controlled and operated electrically. On the left, as installed in an aeroplane; right, the principal component parts, reference to which is made in the text.



The "Eagle" Aerial Camera: An example of an Oblique photograph taken with the "Eagle" Electric camera. Recorded on the right of each exposure made is such information necessary in the making of air maps—time, altitude, inclination, etc.

the automatic period, it is only necesszry to push the button "D" when the dial "E" indicates that the shutter is set. The fourth dial "F" indicates the total number of exposures made with each magazine, while a small red lamp "G" automatically flashes a signal five seconds before an exposure is made, thus enabling the pilot to keep the machine steady at the moment of exposure.

Power for the operation of the camera is obtained from an electric motor, "I," driven from a 12-volt supply source, and driving the camera gear-box through a detachable flexible drive. As a protective measure a friction clutch is inserted between the armature spindle and the driving dog for the flexible shaft, which is so adjusted as to transmit sufficient power to drive the camera under normal conditions, but will slip in the event of a jamb in the magazine gear-box.

The gear-box is an aluminium casting attached by means of a hinge and thumb-screw to the side of the camera body. It contains the various mechanical and electrical devices for changing the film, setting the shutter, controlling the counters, set-indicator and motor, and also carries the turning handle for manual operation.

Should the electric current fail, or not be available, an alternative power device is provided. This consists of a "windmill" "J" in the slipstream of the airscrew, which takes the place of the electric motor. In this case the camera is semi-automatic, the exposures being made by hand, using the Bowden control "H." The "windmill" is thrown out of action, when not in use, by the lever "K."

If required, the camera can be entirely operated by hand, in which case it is necessary to turn the handle provided for this purpose on the gear-box.

The instruments for recording the various data on the negative are contained in a box, forming a complete and separate unit, which can be removed through a door in the side of the camera body. It contains the following:—Veeder Counter, aneroid, two-way spirit level, thirty-hour watch, Ivorine tablet, on which may be recorded camera number, focal length, date, etc., etc. A small 1-in. f/3·5 lens is mounted above each instrument, which is illuminated, for recording the image on the film. We note, however, that while most of the information likely to be of assistance for surveying or map-making is thus recorded on each photograph, there is no provision for indicating the points of the compass—an item which is not, perhaps, absolutely necessary, but which should certainly be useful. Of course, in some cases the shadows cast on the ground, taken in conjunction with the time, would afford sufficient indication of the direction of "north."

The method of supporting the camera in the aeroplane is worthy of special note. Various adjustments are provided, so that the camera may be set at any desired angle to correct the changing position of the aeroplane to the horizontal while the camera may be rotated in its supports to allow for drift.

The weight of the "Eagle" camera, complete with cone and lens, varies from 41 lb. to 51 lb., according to the size of lens fitted, while the other components weigh about 40 lb.; spare magazines, with 100-exposure film, weigh 14 lb. each. The price of this camera is, we understand, £350.

A number of these cameras are already in use by the Royal Air Force (known as the Service Type F/8), and the Aircraft Operating Co. used the actual camera demonstrated last week on the revision work which they carried out for the Ordnance Survey.

PERSONALS

Married

The marriage of Mr. J. E. L. Hunter (late R.N.A.S.), only son of Mr. and Mrs. E. L. Hunter, of Shanghai, and Mrs. Gwendolen Mary Cleaton Mulock, only daughter of the late Mr. and Mrs. Cleaton, took place quietly in London on November 6.

To be Married

The engagement is announced between Maj. Euan J. L. W. Gilchrist, M.C., D.F.C., of Salisbury, Rhodesia, son of Mr. and Mrs. William Gilchrist, of St James, South Africa, and Rosemary, daughter of Mr. and Mrs. Sealy-Allin, Rhodesia (late of Youghal, Co. Cork), and granddaughter of the late Col. T. Goddard, of Colne, Wilts.

Item

The will of the late Flight-Lieut. Reginald Carey Brenton Brading, R.A.F., D.F.C., of Outram Road, Croydon, who brought down 32 enemy aeroplanes during the war, and who was killed in an aeroplane accident near Baghdad on July 26, has been proved at £8,809.

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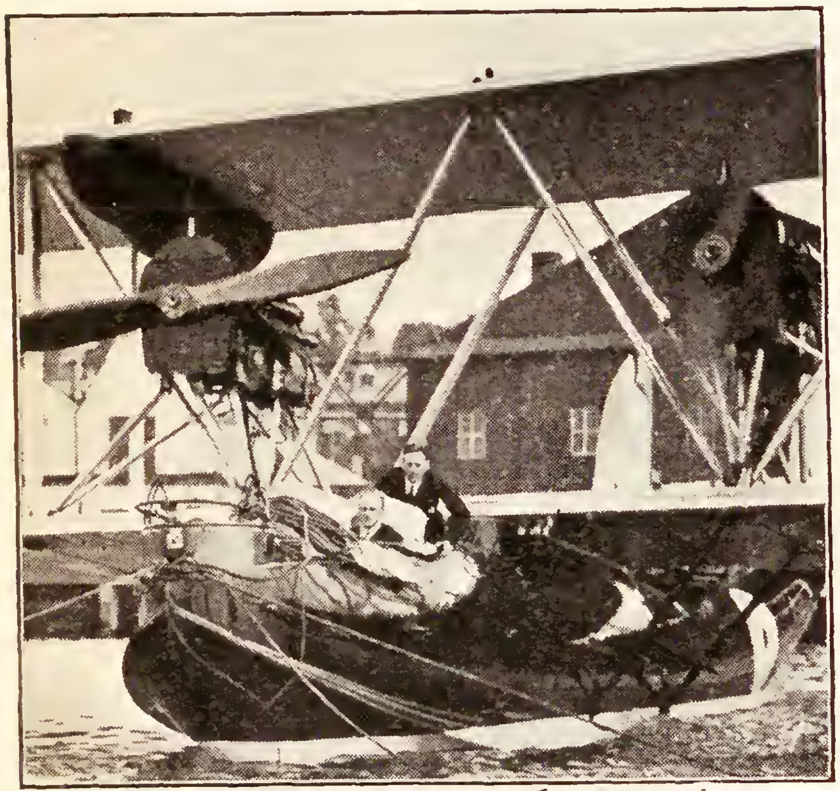

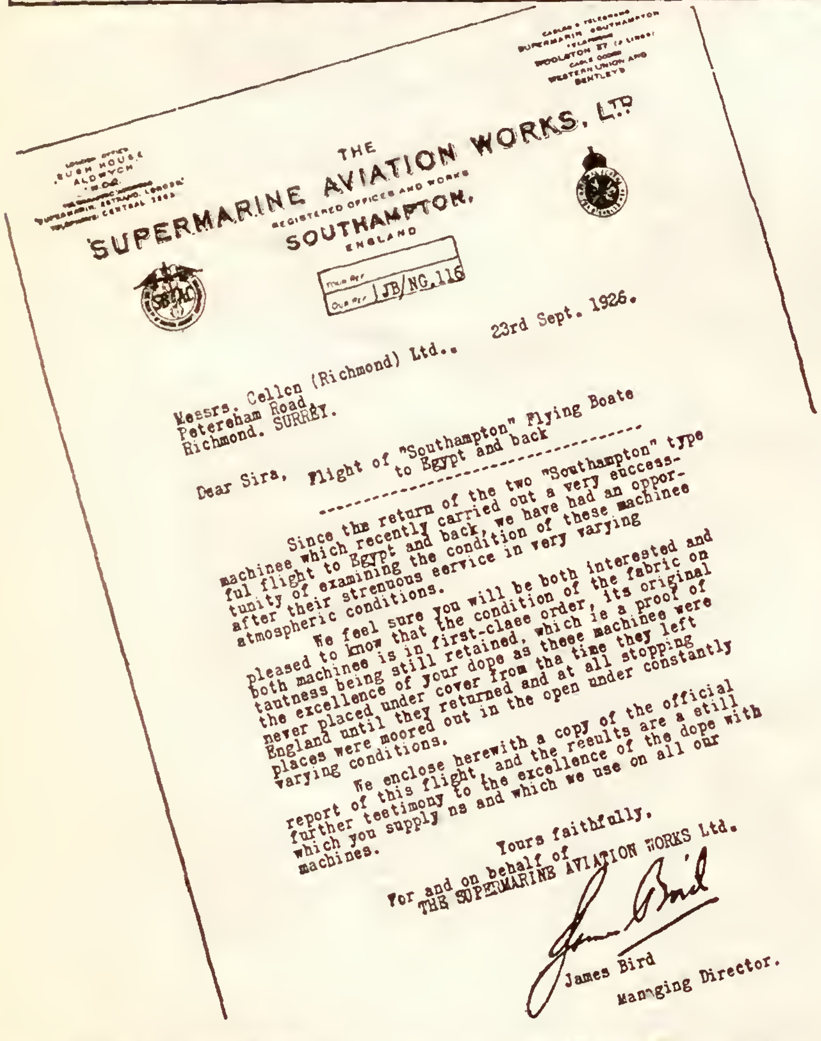

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Dear Sirs, Flight of "Southampton" Flying Boats to Egypt and back

Since the return of the two "Southampton" type machines which recently carried out a very successful flight to Egypt and back, we have had an opportunity of examining the condition of these machines after their strenuous service in very varying atmospheric conditions.

We feel sure you will be both interested and pleased to know that the condition of the fabric on both machines is in first-class order, its original tautness being still retained, which is a proof of the excellence of your dope as these machines were never placed under cover from the time they left England until they returned and at all stopping places were moored out in the open under constantly varying conditions.

We enclose herewith a copy of the official report of this flight, and the results are a still further testimony to the excellence of the dope with which you supply us and which we use on all our machines.

Yours faithfully,
For and on behalf of
THE SUPERMARINE AVIATION WORKS Ltd.
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Inter-Club Members' Scratch Race and Bomb-Dropping event, at the Newcastle Aero Club's Meeting—all won on *PRATTS.*

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won at the Leeds Aerial Pageant by Mr. J. Parkinson, flying a D.H. Moth (27/60 h.p. Cirrus engine), entered in Pilot Instructors' Race—on *PRATTS.*

Pratts

Best on Test

THE ROYAL AIR FORCE

London Gazette, November 2, 1926

General Duties Branch

The following are granted permanent commns. in the ranks stated :—Flight-Lieut. C. R. Carr, D.F.C. ; Nov. 1. Flying Officer E. M. Drummond (Lieut., Half Pay List, Army) ; Oct. 20. Pilot Officer J. S. Blomfield is promoted to rank of Flying Officer ; Oct. 14. Air Vice-Marshal Sir O. Swanu, K.C.B., C.B.E., is placed on half-pay, scale A ; Nov. 2. Flying Officer A. E. Connolly is transfd. to Stores Branch on probation ; Oct. 25. Flight-Lieut. A. Chapman is placed on retired list ; Nov. 1. Flying Officer A. Neeson is placed on retired list at his own request ; Nov. 3. Flight-Lieut. D. S. Jillings, M.C., is granted permission to retain rank of Sqdn. Leader on retirement ; Oct. 1.

The following are transfd. to the Reserve :—

Class A.—Flight-Lieut. A. E. Woodhridge ; Nov. 1.

Flying Officers : F. Beesley ; Nov. 2. J. F. Bythell ; Nov. 2. W. E. Cowan ; Nov. 3. O. J. F. Jones-Lloyd ; Nov. 5.

Class B.—Flight-Lieut. J. M. McEntegart ; Oct. 24.

The following Flight-Lieuts. are transfd. to the Reserve, Class A ; Oct. 24 (substituted for the notification in the *Gazette* of Oct. 26) :—W. Halford, D.F.C., S. H. Potter, R. J. Read.

Flying Officer H. E. F. Saunders is transfd. to Reserve, Class C ; Sept. 12 (substituted for *Gazette,* Sept. 17) ; Flying Officer L. W. Mercer (Lieut., R.A.), relinquishes his temp. commn. on return to Army duty ; Oct. 20. Pilot Officer F. N. Garthwaite relinquishes his short service commn. on account of ill-health ; Nov. 3.

Medical Branch

Temp. Lieut. V. G. Pedley, General List (Army), Dental Surgeon, is granted a temp. commn. as a Flying Officer on attachment to R.A.F. ; Oct. 18. He will continue to receive emoluments from Army sources ; Flying Officer G. J. Hanly, M.B., is promoted to rank of Flight-Lieut. ; Oct. 23.

Chaplains Branch

The Rev. W. P. Hughes is granted a short service commn., with the relative rank of Sqdn. Leader ; Oct. 29.

Memoranda

Sec. Lieut. J. L. Rodrigues is deprived of permission to retain his rank on conviction by the Civil Power ; Oct. 1.

Reserve of Air Force Officers.

A. B. Roche is granted commn. in Class B, General Duties Branch, as Flying Officer, with effect from Aug. 31, and with seniority of Feb. 4 ; E. K. Rayson is granted commn. in Class A.A., General Duties Branch, as a Pilot Officer on probation (Sept. 13) ; Pilot Officer D. S. Purnell is confirmed in rank (Oct. 26) ; Flying Officer H. P. L. Gardner is transferred from Class A to Class C (Oct. 23).

The following relinquish their commns. on completion of service :—Flying Officer K. L. Graham, Flying Officer C. T. Robinson (May 29) ; Flying Officer G. Burton (June 19) ; Flight-Lieut. W. A. Malone (July 13) ; Flying Officer H. St. C. Roy, M.C. (July 26) ; Flying Officer C. P. Murchie (Aug. 2) ; Flying Officer I. R. Taylor (Aug. 14) ; Squadron-Leader C. E. C. Rabagliati, M.C., A.F.C., Flying Officer L. G. Harrison (Sept. 4) ; Flying Officer F. J. H. Ayscough (Sept. 12) ; Flying Officer F. W. Martyn (Oct. 10) ; Flight-Lieut. A. D. Newbury, Flight-Lieut. L. Whitworth, A.F.C., Flying Officer G. Baillie, Flying Officer E. A. J. Brown, Flying Officer K. C. L. Gorringe, Flying Officer J. D. Jackson, Flying Officer, G. Kidd, Flying Officer L. J. Lipscomb, Flight-Lieut. L. H. Pakenham-Walsh, Flying Officer A. J. Packhan, Flying Officer A. W. S. Wagner (Oct. 24).

The commn. of Pilot Officer on probation A. B. Roehe in Class A.A. is terminated on cessation of duty (Aug. 31).

Reserve of Air Force Officers

F. J. Wright is granted a commn. in Class A.A., General Duties Branch, as a Pilot Officer on probation ; Oct. 18. Pilot Officer on probation D. P. Jones is confirmed in rank ; Oct. 27. The following Flying Officers are transfd. from Class A to Class C :—H. Jones ; July 14. G. F. Blackburn ; Nov. 2.

The following relinquish their commns. on completion of service :—Flying Officer M. B. Lacey ; June 26. Flight Lieut. H.-V. Worrall, D.S.C., Flying Officer R. W. Warner, Flying Officer J. S. G. Wrathall ; Sept. 12. Flying Officer J. R. Stafford-Langan, D.F.C. ; Oct. 15. Flying Officer W. Halliwell, Flying Officer A. J. H. Taylor ; Oct. 24. Flying Officer H. W. Procktet relinquishes his commn, on completion of service and is permitted to retain rank of Flight-Lieut ; Sept. 16. Flying Officer J. S. Hughes relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Nov. 3. Flying Officer J. M. Leach resigns his commn. on appointment in the Auxiliary Air Force ; Nov. 2.

Auxiliary Air Force

General Duties Branch

The following to be Flying Officer :—No. 605 County of Warwick (Bombing) Sqdn.—J. M. Leach ; Nov. 2.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch.

Wing-Commander E. R. Manning, D.S.O., M.C., to School of Naval Co-operation, Lee-ou-Solent, to command ; 1.11.26.

Squadron-Leader J. C. P. Wood, to H.Q., Egypt ; 21.10.26.

Flight Lieutenants : F. O. Soden, D.F.C., to No. 605 Sqdn., Castle Bromwich ; 5.10.26. H. A. J. Wilson, O.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 1.11.26. C. Boumphrey, D.F.C., to R.A.F. Base, Malta ; 15.10.26. N. P. Dixon A.F.C. to H.Q., Egypt ; 8.10.26. N. H. Jenkins, O.B.E., D.F.C., D.S.M., to No. 15 Sqdn., Martlesham Heath, on transfer, to Home Estabt. ; 15.11.26. S. E. Storrar, to No. 1 Flying Training Sch. Netheravon, on transfer to Home Estabt. ; 7.11.26. A. J. Warwick, to No. 32 Sqdn., Kenley ; 2.11.26. C. J. Sims, D.F.C., to Sch. of Photography, Farnborough ; 27.10.26. S. E. Toomer, D.F.C., and R. M. Foster, D.F.C., to H.Q., Iraq ; 20.10.26. M. Ballard, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 10.10.26. N. L. Desoer, to Armament and Gunnery Sch., Eastchurch ; 8.11.26.

Flying Officers : E. B. Forster, to Stores Depot, Iraq ; 2.10.26. G. L. Gandy, to Inland Water Transport, Iraq ; 28.9.26. F. G. Jennings, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 7.11.26. L. S. Potter, to H.Q., Iraq. ; 9.10.26. E. A. Sullock, A.F.C., to No. 5 Flying Training Sch., Sealand ; 3.11.26. E. M. Drummond, to R.A.F. Depot, Uxhridge, on appointment to a Permanent Commn. ; 20.10.26. F. H. Cashmore, to Home Aircraft Depot, Henlow ; 1.11.26. W. W. Bradford, to H.Q., Coastal Area ; 1.11.26. L. K. Barnes, to School of Naval Co-operation, Lee-on-Solent ; 21.9.26.

Flight Lieutenants : F. Thomasson, D.F.C., M.M., to Reception Depot, West Drayton ; 1.11.26. E. H. Richardson, to No. 10 Group H.Q., Lee-on-Solent, 20.10.26 ; F. H. Isaac, D.F.C., to H.Q., Wessex Bombing Area, Andover, 2.11.26 ; R. L. McK. Barbour, D.F.C., to Experimental Section. R.A.F., Farnborough, 28.10.26.

Flying Officers : E. M. Drummond, to No. 100 Sqdn., Spittlegate, 3.11.26. J. F. F. Pain, to No. 16 Sqdn., Old Sarum, 9.11.26.

Flying Officers : A. H. C. A. Rawson, to R.A.F. Cadet College, Cranwell, 2.11.26 ; G. E. Nicholetts, to R.A.F. Station, Donibristle, on transfer to Home Estab., 17.10.26 ; F. T. Stacey, to R.A.F. Depot, on transfer to Home Estab., 17.10.26 ; F. W. M. Matthews, to Armament and Gunnery Sch. Eastchurch, 21.10.26 ; G. H. Huxham, to No. 208 Sqdn., Egypt, 20.10.26 ; H. A. Anson, to No. 32 Sqdn., Kenley, on transfer to Home Estab., 13.11.26 ; B. J. J. Nimmo, to No. 2 Armoured Car Co., and Repair Section, Palestine, 1.10.26 ; C. G. H. E. Lumsden, to No. 43 Sqdn., Henlow, 12.11.26 ; H. E. N. Burton and R. W. Holden, to No. 24 Sqdn., Kenley, 1.11.26.

Pilot Officers : J. L. Adams, J. F. Dowdeswell, and R. H. Winn, to No. 9 Sqdn., Manston, 9.11.26; C. A. Anderson, L. G. Gray, F. J. Parker, and L. C. Phillips to No. 13 Sqdn., Andover, 9.11.26 ; R. Benham, to No. 207 Sqdn., Eastchurch, 9.11.26 ; T. B. Byrne, H. J. J. Mumford-Mathews, E. G. C. Stokes, and E. L. Wilson, to No. 2 Sqdn., Manston, 9.11.26 ; D. V. Ivins, to No. 16 Sqdn.. Old Sarum, 9.11.26 ; R. O. O. Taylor, to No. 58 Sqdn., Worthy Down, 9.11.26 ; W. G. Woolliams, to No. 39 Sqdn., Spittlegate, 9.11.26.

Pilot Officers : : H. A. S. Byrne, to No. 30 Sqdn., Iraq., 1.10.26 ; H. V. Crowder, F. G. H. Ewens, and W. J. M. Spaight, to No. 70 Sqdn., Iraq, 1.10.26 ; A. P. Wayte, to Heliopolis Details, Egypt, 20.10.26.

Stores Branch.

Pilot Officer : P. H. Wilcox, to H.Q., Cranwell, on appointment to a Permanent Commission (on probation), 30.10.26.

Accountant Branch.

Flight Lieutenant J. Sullivan, to H.Q., Egypt, 1.10.26.

Flying Officers : S. W. Hill, to H.Q., Cranwell, 8.11.26 ; R. W. Freeman, to No. 4 Flying Training School, Egypt, 20.10.26.

Medical Branch.

Flight Lieutenant T. J. X. Canton, M.B., to R.A.F. Depot, 1.11.26.

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ROYAL AERONAUTICAL SOCIETY
(Official Notices)

Students' Section

Mr. F. Handley Page, C.B.E., Fellow, will address the students on "The Future of Aviation," at their inaugural meeting of the present session. The meeting, to which visitors are invited, will take place in the Society's Library at 7, Albemarle Street, to-day (November 11) at 7 p.m. The chair will be taken by Lieut.-Col. I. A. E. Edwards, C.M.G.

Pilcher Prize.—The Pilcher prize for the best paper submitted by a student to inaugurate discussion at a Students' meeting has been awarded to a paper on "Experimental Flying from the Pilot's Point of View," by Flying-Officer R. Linton Ragg. To this prize has been added a cash prize, kindly given by Lieut. R. V. de Aboim, of the Brazilian Navy, an Associate Fellow of the Society. The two prizes will be presented at the Students' meeting on November 11.

Lecture.—The fourth lecture of the first half of the sixty-second session will be held on November 18 at 6.30 p.m. at thn Royal Society of Arts, 18, John Street, Adelphi, W.C. 2, whee Mr. R. S. Capon will read a paper entitled "Methods of Performance Testing and Analysis." Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C., F.R.Ae.S., will take the chair.

Donation.—The Council wish to express their grateful thanks to the Council of the Society of British Aircraft Constructors for a generous donation of £250 to the Society.

J. Laurence Pritchard,
Hon. Secretary

◆ ◆ ◆ ◆

Inst. Aeronautical Engineers

Sir Charles Wakefield, Bart., C.M.G., has presented to the Inst. Aeronautical Engineers a Gold Medal, to be awarded annually to the designer of any invention or apparatus tending towards the safety of aviation. This medal is to be awarded at the discretion of the Council, and is open to anyone, that is, members or non-members. The Taylor Medal for the most valuable paper read before the Institution during last session has been awarded to Capt. W. H. Sayers, Technical Editor of *The Aeroplane*, and it is to be presented to him at a dinner which the Institution is holding at Kettner's Restaurant, Church Street, W. (8 p.m.), on November 19. Tickets, 12*s.* 6*d.*, exclusive of wines. Dancing after dinner.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

ARRESTER GEARS FOR AEROPLANES

[2147] In your Editorial Comment of last week you question the practical value of arrester gears for army and commercial aeroplanes.

I do not suggest that the landing speed of army machines should be raised because, as you point out, there would consequently be an increased risk in the case of forced landings. The outstanding advantage of a land-arresting apparatus is surely to be found in permitting aircraft to be operated from quite a small base. In time of war it may be necessary to establish temporary landing grounds near the scene of hostilities, and it would be impracticable to find and prepare, in a few hours, an aerodrome of sufficient size to permit of the taking off and alighting of aircraft if these operations were carried on in the usual manner. It would be necessary for the arresting gear to operate in conjunction with some form of catapult to enable machines to take off. Catapults using a powder charge are now a practical success and American aircraft are being launched by such means with a high degree of efficiency.

At the present time we are developing our commercial aerodromes many miles distant from our cities, but in a few years hence it will probably be essential to bring the aerodromes closer in, and then the difficulties of finding accommodation will possibly necessitate the use of arrester and launching gears. The adoption of any such means will, no doubt, come in the first instance through military requirements, and then, if they should prove practical in operation, no doubt commercial aircraft would follow when conditions demanded.

G. H. Dowty

Cheltenham.

⁂

IN PARLIAMENT

Parachutes

Viscount Sandon on October 29 asked the Secretary of State for Air whether the Government have tested the new American invention as to parachutes for the aeroplanes themselves; and whether they propose utilising it for some other analogous device?

Sir S. Hoare: The particular invention referred to has not been tested, but a similar proposal was carefully considered and rejected some time ago. While a parachute to sustain an individual is quite practicable, the weight and bulk of one to sustain a complete aircraft would be incompatible with present-day performance, and, so far as the aircraft itself is concerned, it is considered to be better to make it safe to fly than to rely on extraneous aids of this nature.

⁂

Society of British Aircraft Constructors, Ltd.

We are asked to announce that the officers of the Society of British Aircraft Constructors, Ltd., for the year 1926-27 are as follows:—

Chairman: Mr. T. O. M. Sopwith, C.B.E. (H. G. Hawker Engineering Co., Ltd.); Vice-Chairman (Aircraft): Capt. P. D. Acland (Vickers, Ltd.); Vice-Chairman (Engines): Mr. H. T. Vane, C.B.E. (D. Napier and Son, Ltd.); Hon. Treasurer: Squad.-Comdr. James Bird (Supermarine Aviation Works, Ltd.).

R.N.A.S. Armoured Cars Re-union Dinner

R.N.A.S. Armoured Cars re-union dinner was held at Anderton's Hotel on October 29. Lieut.-Comdr. H. E. Perrin was in the chair, and the attendance of 74 officers and ratings testified to the continued interest taken in this gathering. All present thoroughly enjoyed the excellent concert provided by "Ourselves" which followed the dinner.

The Royal Air Force Memorial Fund

The usual meeting of the Grants Sub-Committee of the Fund was held at Iddesleigh House on November 4. Mr. W. S. Field was in the chair, and the other members of the committee present were: Mrs. L. M. K. Pratt-Barlow, O.B.E., Squadron-Leader D. Iron, O.B.E. The committee considered in all 10 cases, and made grants to the amount of £147 19*s*. 6*d*. The next meeting was fixed for November 18 at 2.30 p.m.

Westland Aircraft Society (Petters, Ltd., Yeovil)

A Society has been formed under the above title by the employees of the Westland Aircraft Works, Yeovil. The intention is to arrange a series of weekly lectures, and engage in such other activities in connection with aeronautics as the members may decide. The President of the society is Mr. R. A. Bruce, M.I.M.E., M.Inst.C.E., M.Sc., managing director of the Westland Aircraft Works. At present, a series of classes are being held weekly for prospective ground engineers, whilst lectures of a more general interest will be given at intervals. The first class was held on Wednesday evening, October 27, when Mr. W. G. Gibson, works manager of the Westland Aircraft Works, read an excellent paper on "Aircraft Erection and Rigging." On Friday evening, October 29, Capt. Hill gave a lecture on "The Pterodactyl" The lecturer outlined the conception and developments of the tail-less aeroplane, illustrating by means of lantern slides and models the progress and features of construction. It was pointed out that there were some fifty fatal accidents every year in the R.A.F., the most of these could be traced to lack of control under certain conditions, and the object of the designer was to produce a machine which would remain controllable under any condition of flight. Capt. A. S. Keep, who was in the chair, invited questions, and an interesting discussion took place. A further lecture was given on November 4 by Mr. W. G. Gibson, his subject being "Faults Reported after Flight Tests: Their Diagnosis and Correction"

Oil Consumption of "Cyclone" Engine

In our article in last week's issue on the Beardmore "Cyclone" engine, the oil consumption was erroneously given as 0·1 lb./h.p./h. This figure was wrong and should actually have been 0·01 lb./h.p./h. In making our estimate of the fuel and oil for one hour we took in rough and ready figures a combined fuel and oil consumption of 0·50 lb./h.p./h. which gave 475 lbs. By giving the engine the benefit of the last decimal, using the figure 0·49 lbs./h.p./h., the figure for one hour becomes 465·5 lbs. and the combined weight for the engine, fuel and oil becomes 2,615·5 lbs. instead of 2,625 lbs. For 10 hours' running the combined weight becomes 6,805 lbs. instead of 6,900 lbs. However, the consumption of an engine in the air is likely to differ somewhat from bench test figures, and we think our original figures, apart from the printer's error in giving 0·1 b. instead of 0·01, should be near enough for practical purposes.

⁂

PUBLICATIONS RECEIVED

Rigging and Maintenance Notes. Avro Type 504K, 100 h.p. Mono. Air Publication 916. September, 1926. H.M. Stationery Office, Kingsway, London, W.C.2. Price 6*d*. net.

Motor Electrical Manual. Third edition. Temple Press, Ltd., Rosebery Avenue, London, E.C. Price 2*s*. 6*d*. net.

Air Navigation Directions, 1926 (*A.N.D.* 6). H.M. Stationery Office, Kingsway, London. W.C.2. Price 6*d*. net.

⁂

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1925

Published November 11, 1926

18,120. G. Yamanouchi. Hydroplane vessels. (259,676.)
20,338. D. J. Mooney. Metal framework for aircraft. (259,710.)
21,081. E. O. Tips. Controlling devices for aeroplane wings. (259,718.)
26,703. J. E. Broyles, H. E. Robertson and T. H. Weiler. Anchoring-means for airships. (259,772.)

APPLIED FOR IN 1926

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9,062. Limited Co. (Formerly Skoda Works, Plzen). Aerial bombs) (250,271.)
13,239. Douglas Motors, Ltd. and J. J. Barter. Carburettors. (259,861.)

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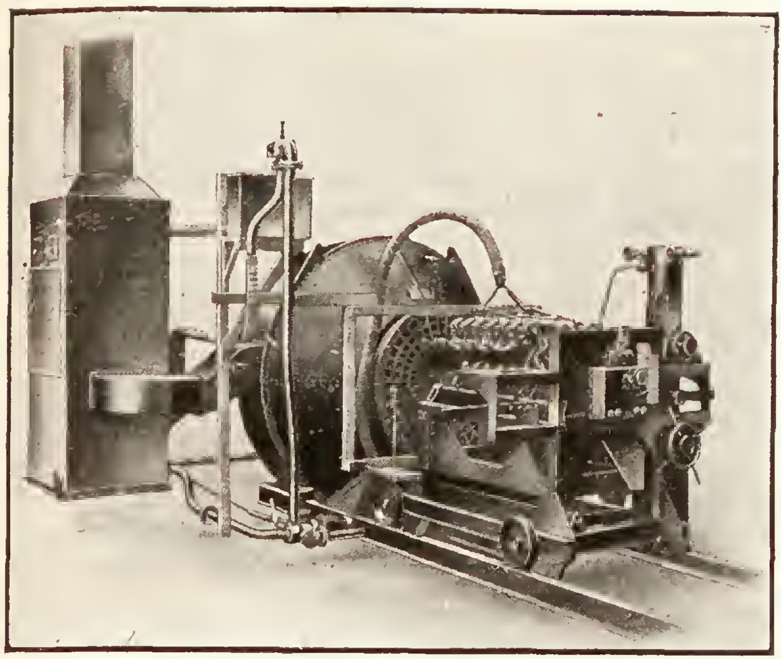

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Fairey Aviation Co., Hayes, Middlesex.
Hayes 0136-7-8.
The Gloucestershire Aircraft Co., Ltd., Sunningend Works, Cheltenham.
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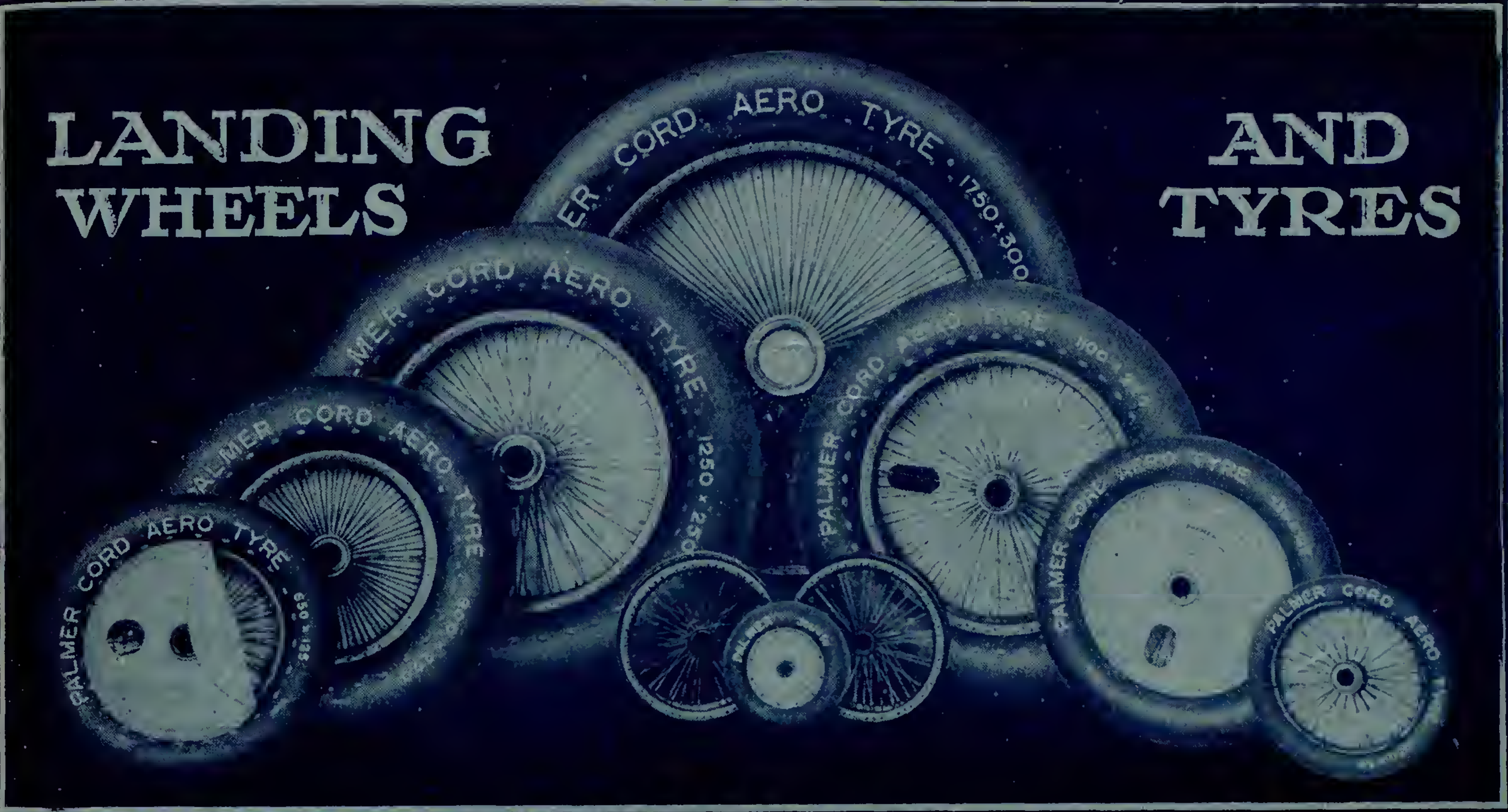
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Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m.	m/m	m/m
375 × 55	168	111.12	25.4	Central
300 × 60	16	111.12	25.4	Central
450 × 60	30	89.	31.75	Central
,,	172	130.	38.09	Central
575 × 60	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
650 × 65	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
600 × 75	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
700 × 75	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
700 × 100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
700 × 100	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
650 × 125	119	178.	55.	132/46
,,	147	178.	55.	Central
,,	188	120.	34.92	Central
750 × 125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
800 × 150	161*	185.	55.	135/50
,,	162*	185.	55.	Central
,,	163*	185.	66.67	135/50
,,	169†	185.	55.	135/50
,,	177	185.	55.	135/50
,,	183	185.	55.	Central
,,	211*	185.	60.32	135/50
1000 × 150	167	185.	55.	125/60
,,	174	250.	80.	Central
,,	182	185.	55.	Central

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
1000 × 150	187	220.	66.67	Central
,,	201	185.	60.32	125/60
,,	210	185.	60.32	Central
1000 × 180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
,,	166	185.	55.	125/60
900 × 200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	157	185.	80.	Central
,,	202	185.	60.32	Central
1100 × 220	134	220.	66.67	Central
,,	136	250.	80.	Central
975 × 225	192	185.	60.32	Central
,,	194	185.	55.	125/60
1250 × 250	133	250.	80.	Central
,,	154	304.8	101.6	Central
1500 × 300	115	304.8	101.6	Central
,,	126	304.8	152.4	Central
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,,	191	350.	150.3	Central
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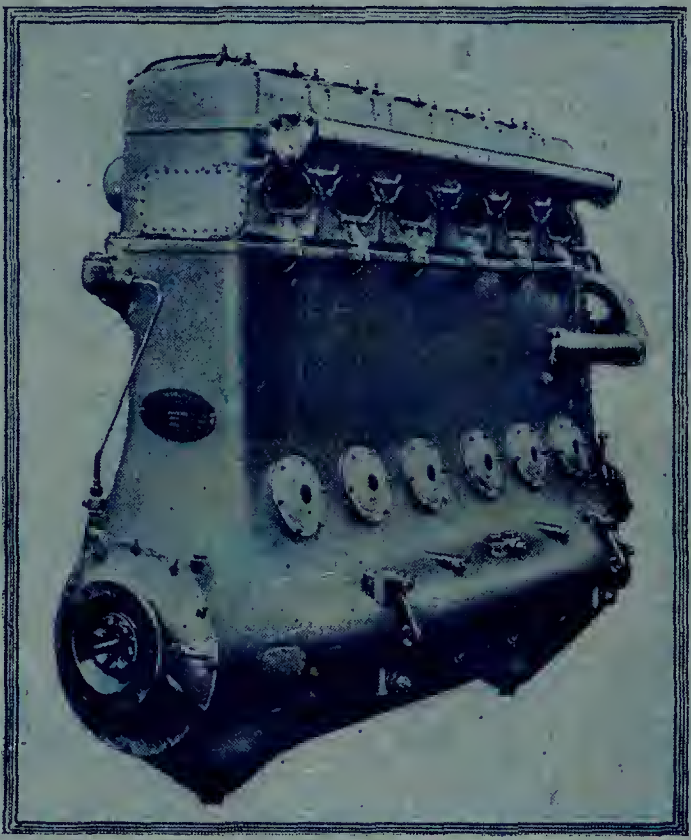

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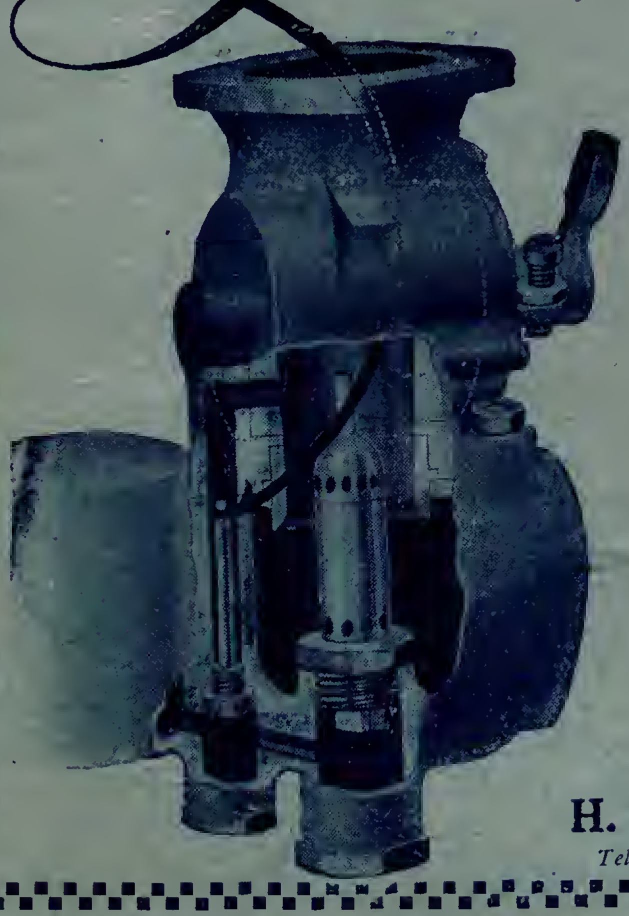

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LOCOMOTION AND TRANSPORT.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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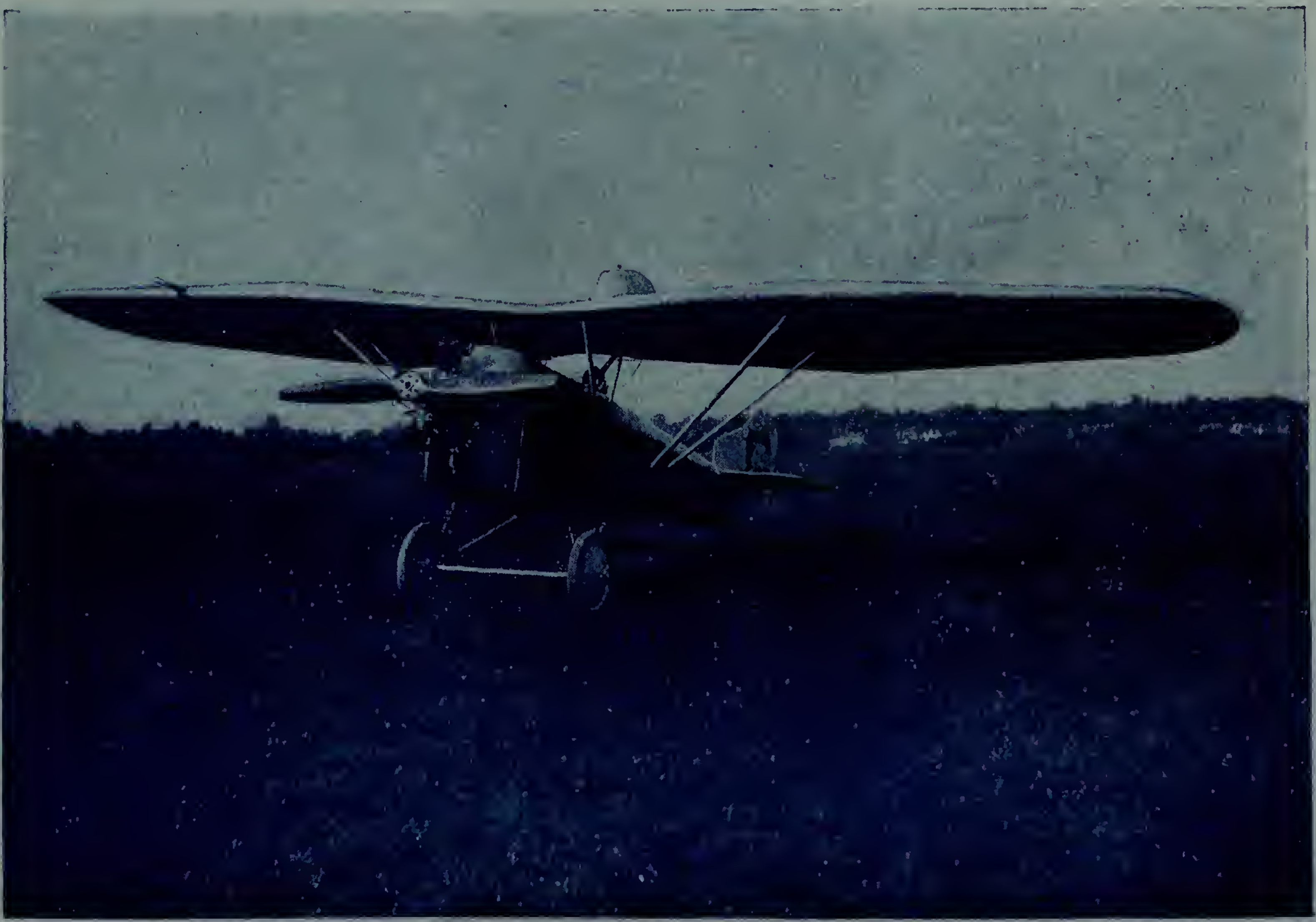

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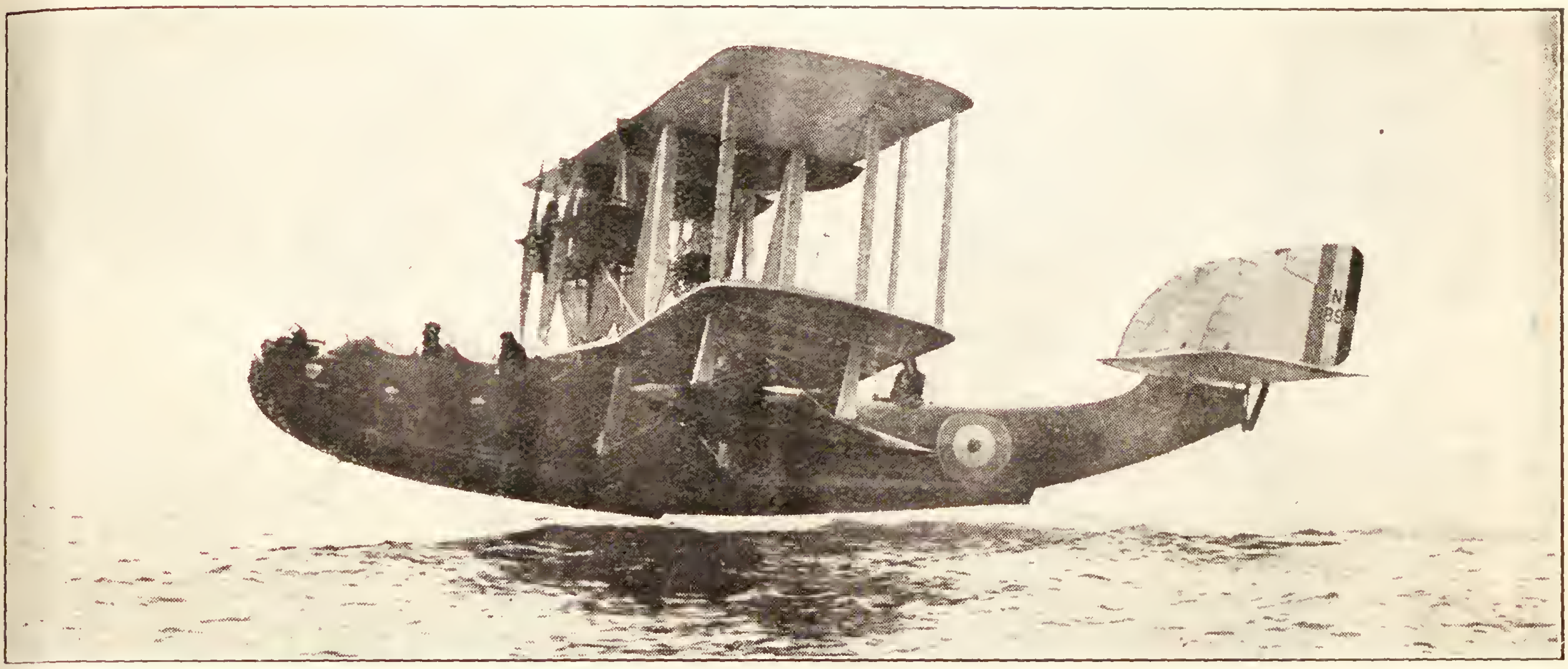

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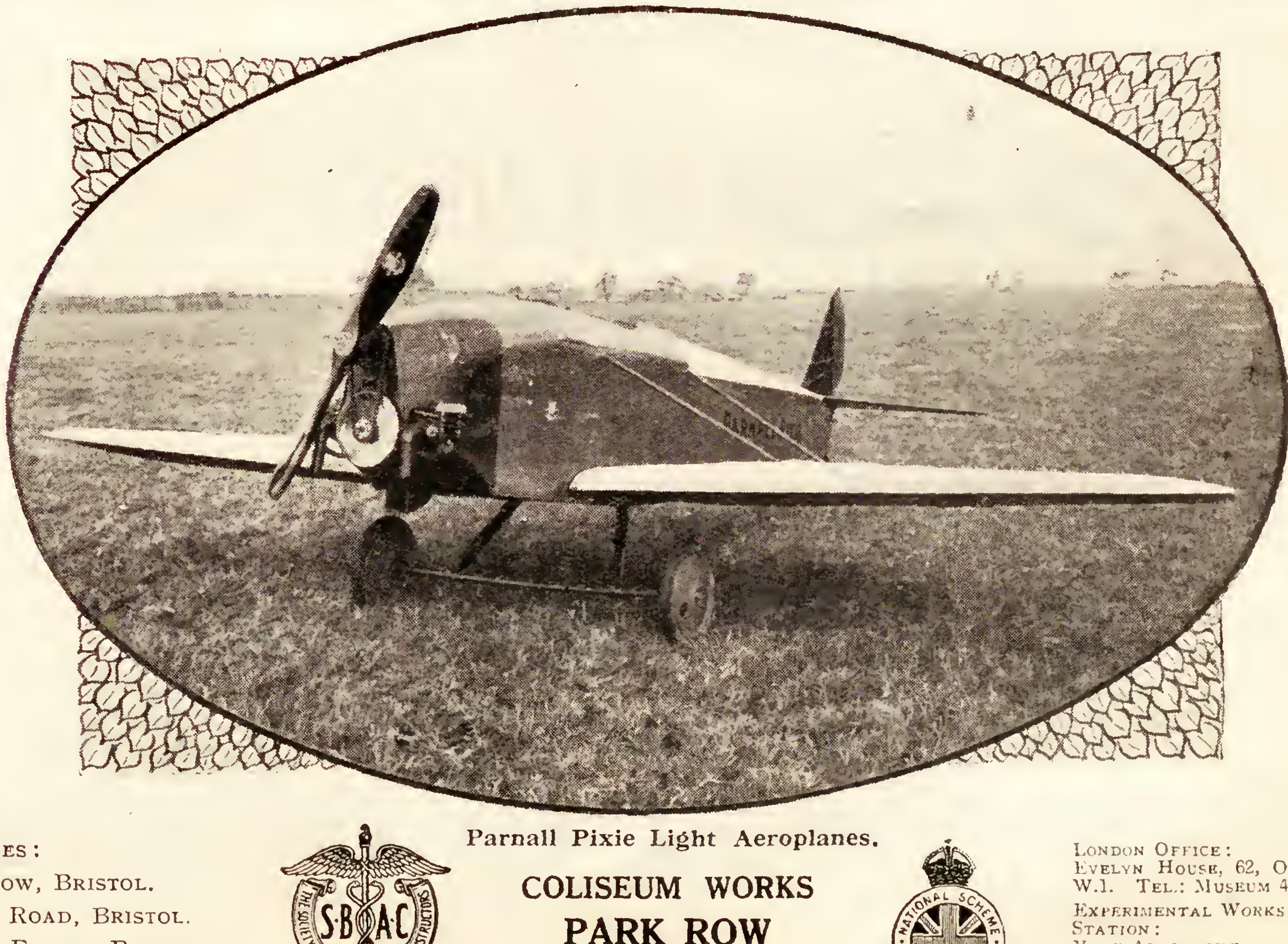

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Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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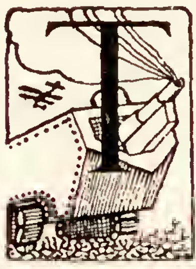
DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Nov. 18	Mr. R. S. Capon. "Methods of Performance Testing and Analysis," before R.Ae.S.
Nov. 21	Lecture, "Meteorology in the Service of Man," by Dr. G. C. Simpson, C.B., at the Guildhouse, Eccleston Square, S.W.1.
Nov. 30	Mr. F. S. Barton, M.A., F.Inst.P. "Air Photography Apparatus," before Inst.Ae.E.
Dec. 2	Mr. P. B. Henshaw. "Alloy Steels for Aero Work," before R.Ae.S.
Dec. 3-19	Paris Aero Show
Dec. 9	Captain F. Entwistle, B.Sc. "Wind Structure in Relation to Air Navigation," before Inst.Ae.E.
Dec. 16	Wing-Comdr. C. D. Breeze, A.F.C., R.A.F. "The Training of Aircraft Apprentices," before R.Ae.S.

EDITORIAL COMMENT.

The Schneider Seaplane Race

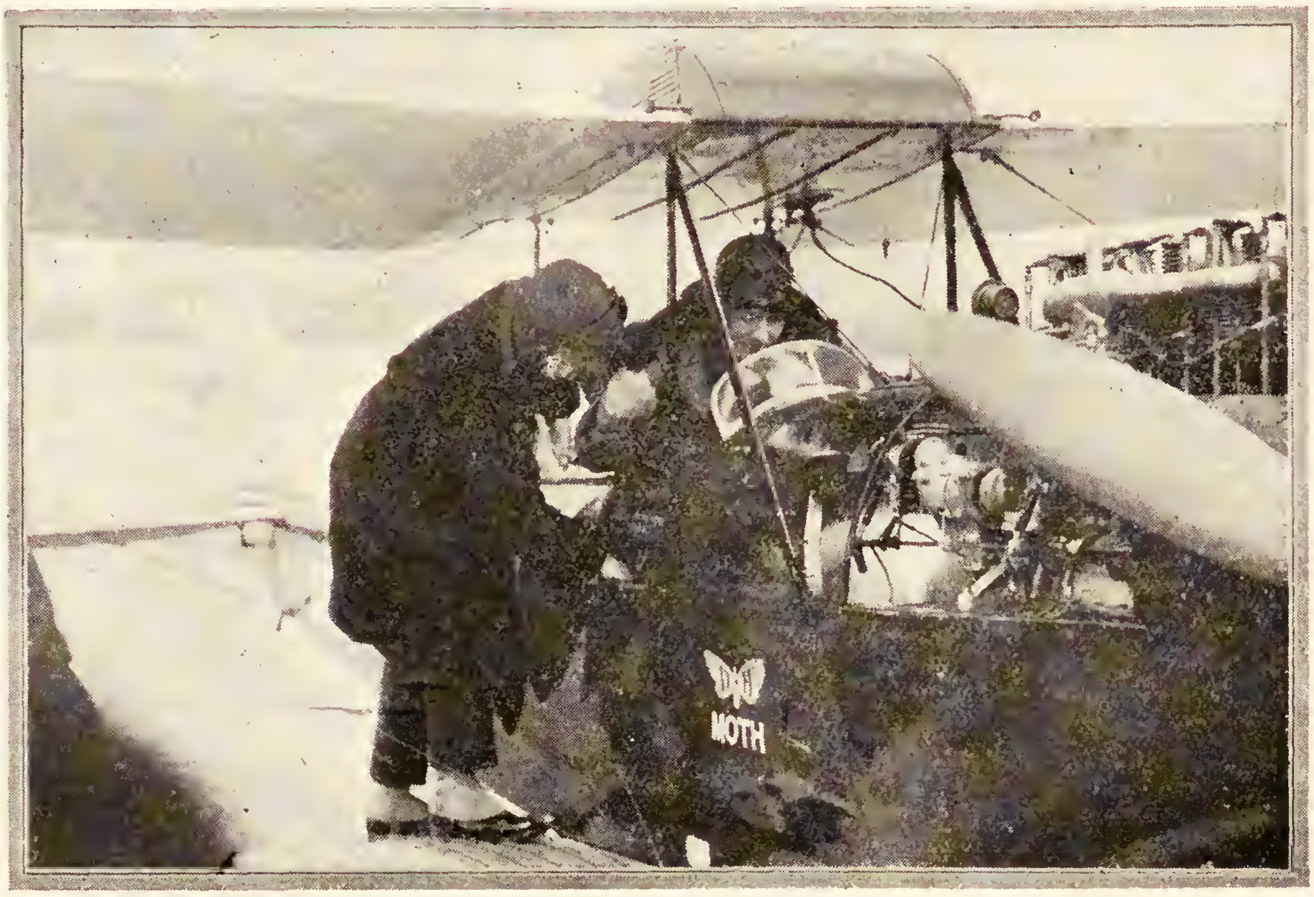


THIS week's issue of FLIGHT is by way of being a seaplane number. This is pure coincidence, and we disclaim any intention to make it so "with malice aforethought." At the same time it is, perhaps, indicative of the trend of modern development. The serious student of aviation cannot have failed to note during the last two years or so a marked change in the general attitude, and more particularly a change in the official attitude, towards the seaplane. Where a few years ago the view was pretty generally held that, weight for weight and power for power, the seaplane was necessarily less efficient than the land machine, *i.e.*, in its commercial form carried a smaller paying load, there is now a tendency to revise that opinion, and even to reverse it, in the case of large flying-boats at any rate. The decision of the Air Ministry to order a considerable number of new large flying-boats, and to push on with a "high-speed" programme for seaplanes of the racing type, are both indications of this change in outlook. On the civil side the last couple of years have seen the production of several new twin-float seaplanes, or, at least, the conversion of a number of landplanes into seaplanes for special purposes. Thus everything points to an awakening to the possibilities of this type of aircraft. Nor has this realisation been confined to Great Britain only. In most foreign countries a great deal of very serious work has been carried out, and there is every indication that we are on the threshold of the opening of what may well come to be regarded as the "seaplane era." We on FLIGHT have for years made ourselves the champions of the cause of the seaplane, and we therefore naturally welcome most heartily this beginning of the materialisation of our dreams (if one likes so to regard them). Thus we make no apology for the somewhat salty tang of the present issue, which is a result of a coincidence by which it becomes necessary to refer to and illustrate the Supermarine "Southampton," the de Havilland 50 on floats intended for the African air route, the "Moth" on floats which is going to America, and finally, the Schneider Cup seaplane race. As we have already said, there was no intention on our part to make this week's issue a seaplane number, but we are by no means sorry that it has chanced to turn out as one, and we feel justified in regarding this fact as a sign of the times.

The subject naturally in the minds of everyone this week is that of the seaplane race for the Schneider trophy, in which the Italian pilot, Major Mario di Bernardi, scored a magnificent victory on the Macchi monoplane with 800 h.p. Fiat engine. We feel sure all our readers will join us in congratulating our friends the Italians most heartily on their splendid and successful effort. In this connection it should be remembered that Italy took part in last year's Schneider Cup race with a machine of the monoplane flying-boat type, which proved in actual racing hopelessly outclassed by the American and British machines in point of speed. To have set to work and within the year to have produced a machine capable of beating the American defenders is an achievement of which the Macchi and Fiat companies, and the whole Italian nation for that matter, may be justly proud. The 1926 Schneider Cup race was won at the astonishing average speed of 246·496 m.p.h. It may be recollected that last year the race was won by Lieut. "Jimmie" Doolittle at an average speed of 232·573 m.p.h., so that over the triangular course the Macchi is 14 m.p.h. faster than last year's winner.

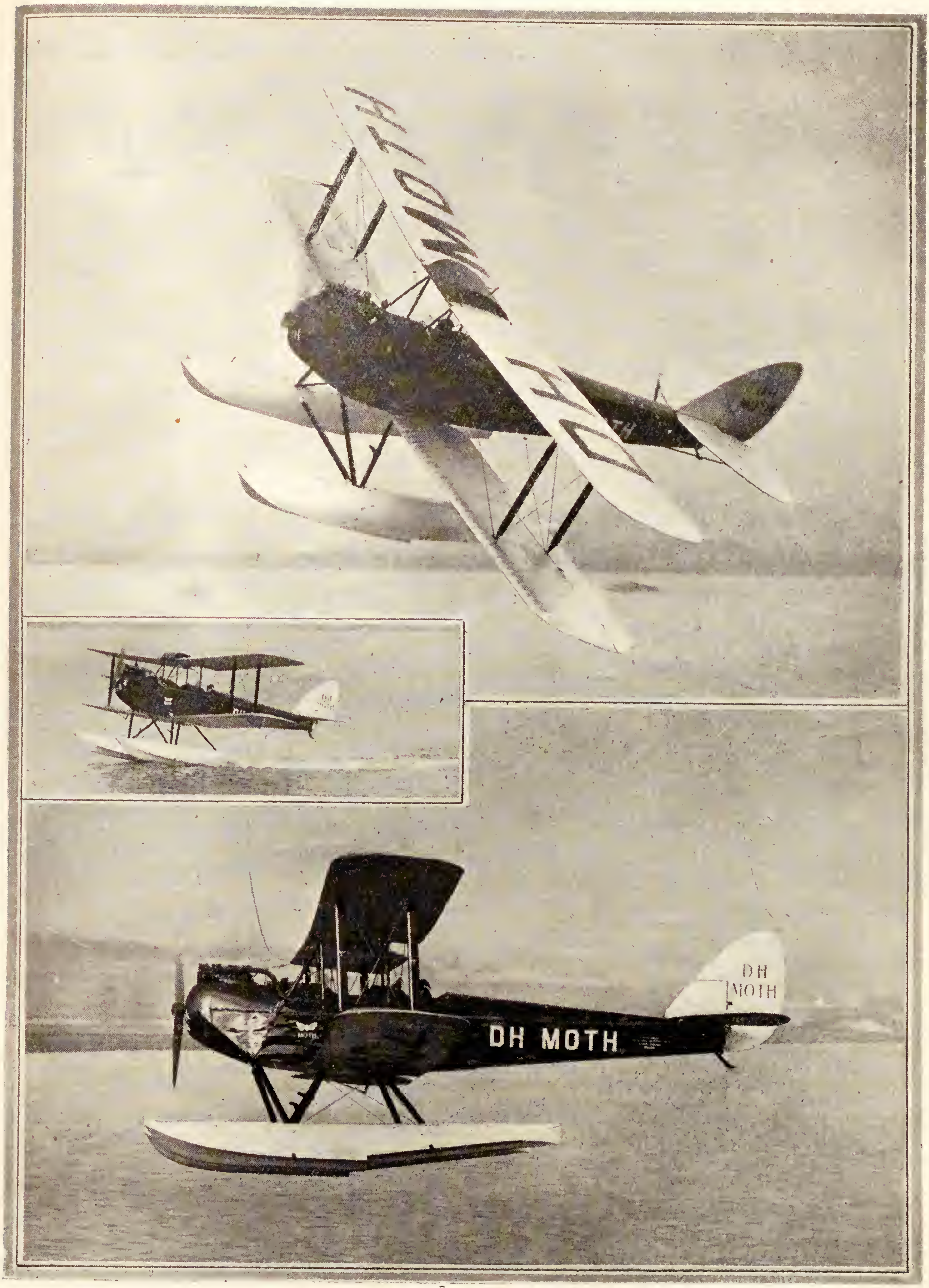
Concerning the winning Italian Macchi monoplane, little information is available at present, but the photograph published in FLIGHT this week shows it to be of extremely clean design. In connection with this machine a somewhat curious situation has arisen. It is now general knowledge that three distinct types of racing seaplanes are under construction for the British Air Ministry, and that one of these is a Supermarine with the type number S.5. This machine is to be treated as "secret" for the moment, but a reference to it appears to be called for here. The S.5 and the Macchi machines are astoundingly alike, except for the fact that whereas the British machine will have a Napier racing engine of the "broad arrow" type, the Macchi has a Fiat Vee-type engine. Lest it might be thought, when presently the Supermarine S.5 emerges from its present veil of secrecy, that this machine is a "copy" of the Macchi (a conclusion that might very easily be reached, and with some excuse, as the Macchi appeared first) it may be well to state very briefly what appears to have taken place. Evidently the Macchi designers and Mr. R. J. Mitchell, the chief designer of the Supermarine Aviation Works, took last year's Supermarine S.4 as a good starting point, and following the same lines of reasoning to a logical conclusion, both arrived at very much the same type of machine. These facts should effectively dispose of any subsequent talk of "copying."

As regards the effect of the Italian victory, so far as Great Britain is concerned, the immediate outcome will, of course, be that the next Schneider Cup Race will be held in Italy. At the last conference of the *Fédération Aéronautique Internationale*, it was decided to hold this event every other year instead of annually. Thus the next race for the Schneider Trophy will be held in Italy in 1928. That neither Italy nor the United States will rest content with their present machines may be taken for granted. The question therefore arises what should be done in the matter by this country. The three types of racers at present under construction have, presumably, been designed with last year's speeds in view, and even if they are estimated to have a good margin over the 1925 speeds, the new speeds put up by this year's Macchi must have reduced that margin somewhat seriously, and by the time Italian progress between now and 1928 has been allowed for the margin may have vanished altogether. It would seem that our best policy would be to push on with the present machines as rapidly as possible, learn as much as we can from them, and then set to work to produce the challengers for 1928. It is to be hoped that the Air Ministry, or perhaps one should say the Treasury, will do their share towards making such a programme possible.



A "Moth" for America: This photograph shows Sir Alan Cobham assisting Lady Cobham into the "Moth" seaplane preparatory to making a short test flight at Rochester on Monday last. The "Moth" looks extremely well in its seaplane form, and gets off and alights remarkably well, while having, apparently, lost nothing in air performance.

"FLIGHT" *Photograph*]



[" FLIGHT " *Photographs*

THE UBIQUITOUS " MOTH " : Having conquered the world, so to speak, as a landplane, the de Havilland " Moth " has now been most successfully turned into a seaplane, and Sir Alan Cobham will take one of these machines with him to America, where the " Moth " is to be built under licence, and will fly, with Lady Cobham, the last few miles from Sandy Hook to New York. The machine is here seen being tested at Rochester by Capt. Hubert Broad. The floats were made by Short Brothers, and, in fact, are those originally fitted to the Short " Mussel." The engine is a " Cirrus " Mark II.

THE SUPERMARINE "SOUTHAMPTON"

Two Napier "Lion" Engines

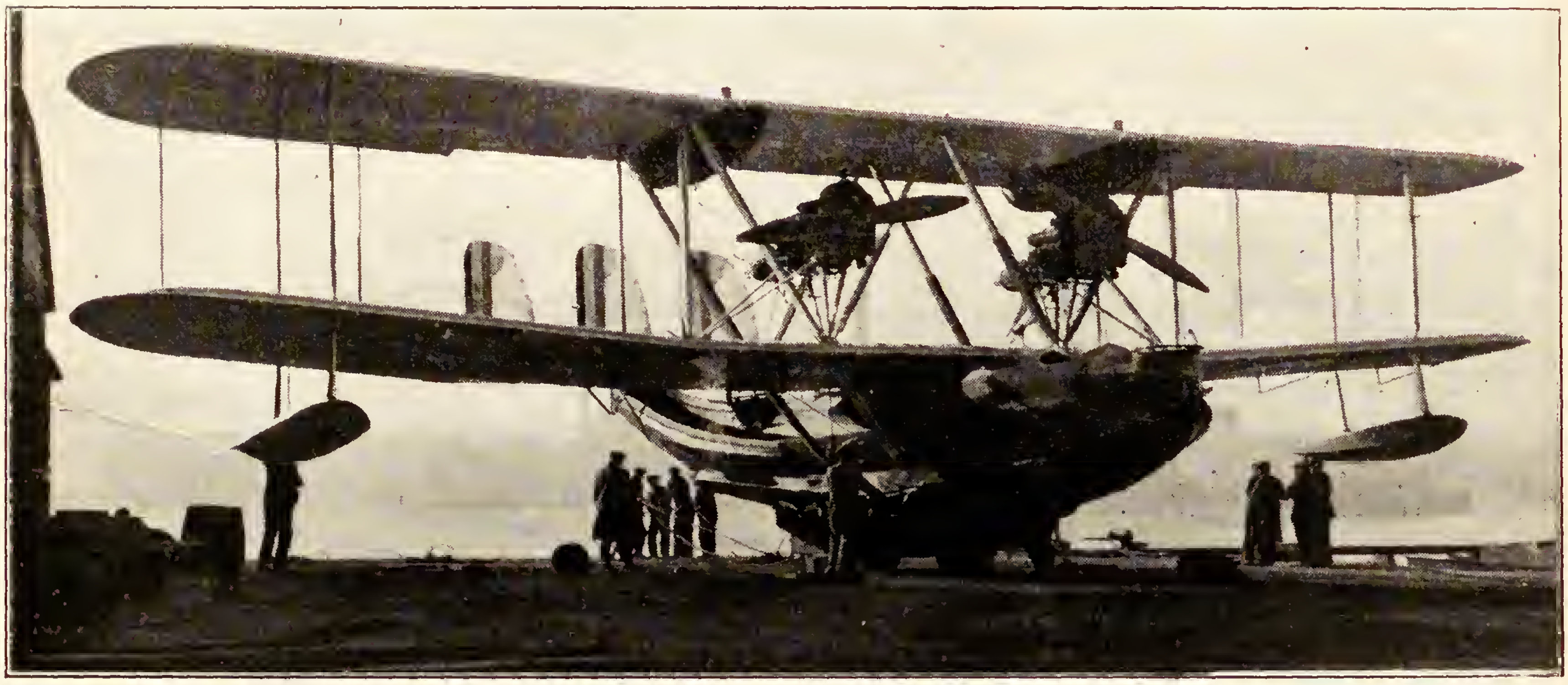
The Supermarine Aviation Works, Limited, occupy a somewhat unique position inside the British aircraft industry. Founded by Mr. Noel Pemberton Billing in 1913 (Mr. Billing, by the way, has had no connection with the company for a number of years) this firm concentrated from the first upon the design and construction of seaplanes of the flying-boat type. Machines of other types have been produced, it is true, such as the Pemberton Billing "seven day 'bus" (so called from the fact that it was built in a week), and the "Night Hawk" triplane built during the war, while of more recent years the firm has built a few light 'planes and last year the Supermarine S.4 for the Schneider Cup seaplane race, the latter machine being, of course, a twin-float seaplane of the monoplane type. In the main, however, the firm has specialised in flying boats even for fast machines, and it will be recollected that it was on a machine of this type that Captain Biard won the Schneider Cup Race at Naples in 1922. After the 1923 Schneider Cup Race at Cowes, however, it was decided that the flying-boat type was no longer fast enough for the speeds demanded, and Mr. R. J. Mitchell, the firm's chief designer, set to work and produced the S.4, to which reference has been made above.

Another respect in which the Supermarine Aviation Works have differed from most other firms, apart from concentrating on the production of flying-boats, has been that of further specialising on the type of flying-boat hull which has now come to be known as the "Linton Hope" type, consisting of a main hull of approximately circular cross-section, built on to which, as a separate structure, are the two steps. In this connection it is rather interesting to recall that even the very first Supermarine flying-boat was more or less of this type. This machine, the P.B.I had a cigar-shaped hull, built, if we remember right, with a ply skin of spruce planking running fore and aft, and having a single step. This machine, which was exhibited at the Olympia Aero Show in 1914, was not a success, it is true, but the main idea of the circular flexible hull was undoubtedly there in a somewhat crude and incompletely understood form, and all Supermarine flying-boats built since those early days have retained this feature of the circular flexible hull. In modern times this type has come to be looked upon almost as the standard type, but it is worth keeping in mind that when Supermarines first started producing hulls of this type the general practice was to design hulls with straight "V" bottoms and flat sides.

Having specialised for thirteen years on the design and construction of flying-boats, it is not to be wondered at that the Supermarine Aviation Works have secured a leading position in this branch of aircraft work, and within the last year or so the firm has produced a boat which proved an instant success and large orders for which have been placed by the British Air Ministry. This type has become known as the "Southampton," and the machine having gone into quantity production it has now become possible to give a detailed description of it, unfettered by the rules of secrecy which surround all aircraft built for the British Air Ministry until the restrictions are raised upon the machine being ordered in quantities. The Supermarine "Southampton," among its many other excellent features, incorporates the somewhat unusual one of being able definitely to fly and manœuvre with one of its two Napier "Lion" engines stopped. There are probably very few types of twin-engined aircraft in the world able to do this, and the fact that the "Southampton" will do it with comparative ease speaks well for the design of the machine.

It will not be unknown to readers of Flight that during the years immediately following the war the flying-boat type of machine received somewhat step-motherly treatment by the authorities, a fact upon which we have commented frequently in Flight, pleading for greater support for this type of machine which, in our view, is the logical type to develop for British Empire aviation. For a number of years but little was done, and one should not blame the Air Ministry unduly for this, since war-time experience with flying-boats had not been altogether satisfactory, the war-time hulls being somewhat frail and the percentage of useful load carried rather small in comparison with aeroplanes of the same power. The idea rather gained currency that the flying-boat as a type was necessarily less efficient than a land machine. This view has never been held by the Supermarine Aviation Works, and certainly recent developments seem to indicate that a well-designed flying-boat of medium size is at least as efficient as the land machine of about the same weight and power, while it seems very probable that the future will show that in really large machines the flying-boat may be far and away more efficient than its counterpart on wheels. Moreover, so far as can be seen at present, it seems probable that a practical limit in size is likely to be reached much sooner with land machines than with flying-boats, so that if we look to the really large aircraft of the future, the flying-boat type appears to hold very considerable claims on our attention.

However, to return to the history of the Supermarine "Southampton." During the slump to which we have referred, the Supermarine Aviation Works produced a civil



THE SUPERMARINE "SOUTHAMPTON" Three-quarter front view of the machine on the slipway. This photograph also gives a good idea of the somewhat unusual arrangement of the interplane struts. The Napier "Lion" engines are mounted on struts independent of the wing structure and can be removed without interfering with the wing bracing.

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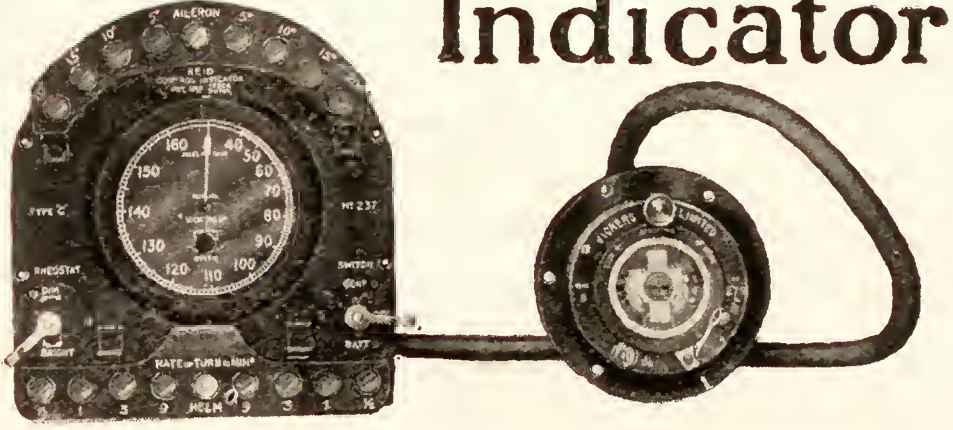

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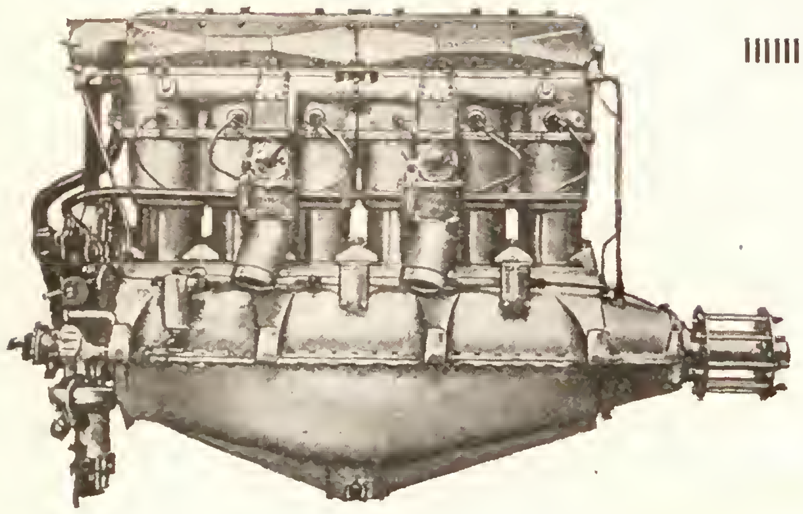

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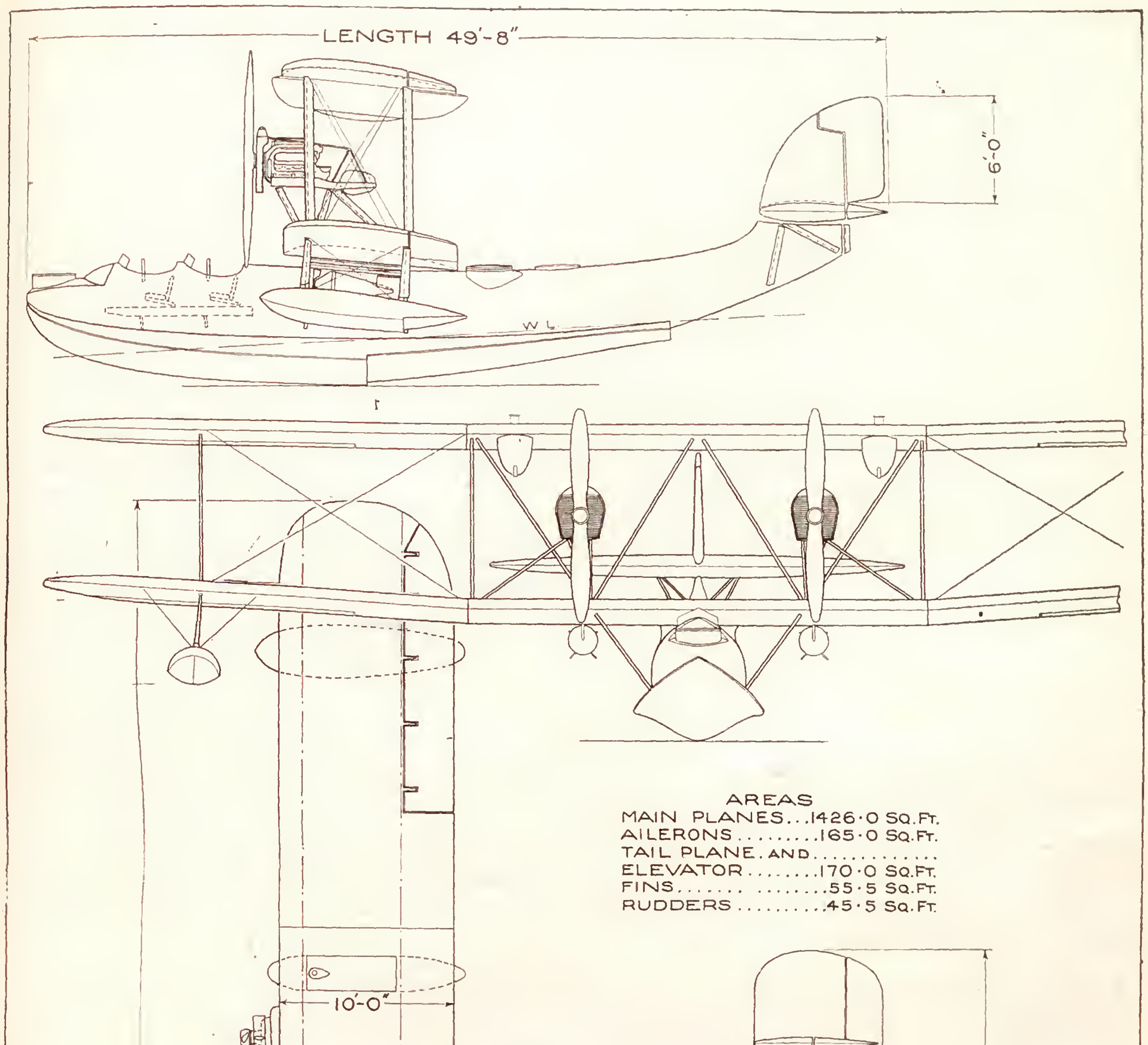
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10'-0"
24'-0"
SPAN 75'-0"
SUPERMARINE
"SOUTHAMPTON"
2 NAPIER "LION" ENGINES
0 2 4 6 8 10 12 14 FEET
0 1 2 3 4 METRES

THE SUPERMARINE "SOUTHAMPTON": General arrangement drawings, to scale.

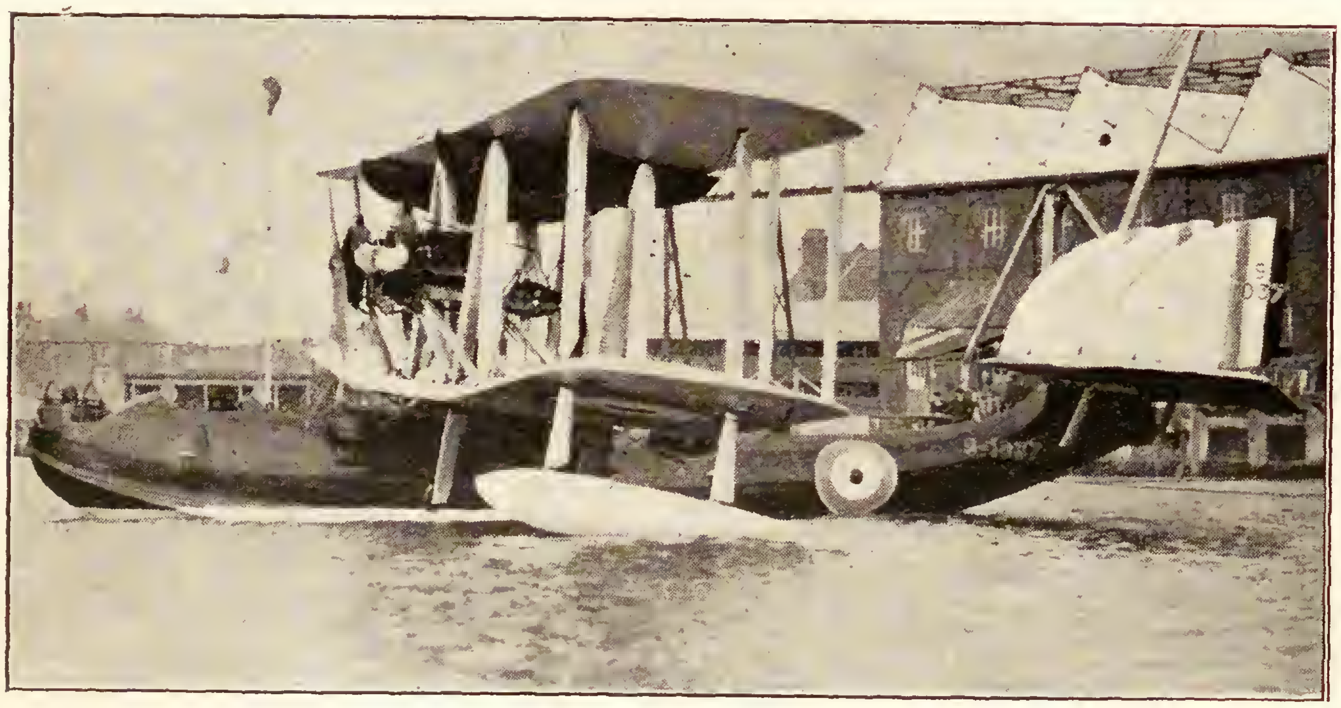
flying-boat, the "Swan," which was a really remarkable machine in many ways, and which appeared to put a somewhat different aspect on the flying-boat question. On the strength of the results obtained with the "Swan," the Air Ministry decided to give the Supermarine Aviation Works a chance to retrieve the reputation of the flying-boat, and a contract for six machines was placed in 1924. The placing of such a contract was, incidentally, significant of the trust which the Air Ministry placed in this firm, since it was an unusual procedure to order six machines of an experimental type. Needless to say, the confidence of the Air Ministry proved to be not misplaced, and the direct outcome was the "Southampton" flying-boat, which forms the subject of this article. Work was commenced in August, 1924, and the first machine was flying on March 14, 1925. The machine was found to provide one of those somewhat rare instances in which a machine is absolutely "right" straight away. No modifications of any kind were found to be necessary, and the machine was delivered by air to the Experimental Air Station at Felixstowe on the following day. This feat of designing and constructing a large twin-engined flying-boat in a period of only 7½ months must be regarded as a remarkable achievement. The machine then went through its type tests at Felixstowe, and everything went "without a hitch," with the result that the trials were completed in record time. The "Southampton" was then adopted as the standard twin-engined reconnaissance flying-boat of the R.A.F., and by now a large number of "Southamptons" have been delivered, while many more are still on order.

Hardly had a flight of these machines been handed over to the Service, than it was announced that they would undertake an extended cruise, in conjunction with the Fleet, around the British Isles. This cruise, which commenced on September 3, 1925, was accomplished without incident, and the success, from the Service point of view, was such that, on October 8, 1925, the Air Ministry issued a special communique praising the boats. This communique was published in FLIGHT at the time, and there is thus no need to repeat it here, beyond recalling that the cruise was one of some 10,000 miles in very bad weather.

The Supermarine "Southampton" about to alight.

On July 1, 1926, commenced the first long-distance foreign cruise by R.A.F. flying-boats to Egypt and back. Like the previous one, this cruise was a complete success, and again an announcement was issued by the Air Ministry (on August 2, 1926) concerning the flight of two "Southamptons" from Plymouth to Aboukir and back, a total distance of some 7,000 miles. This flight was carried out to a pre-arranged schedule, and with one exception the programme was strictly adhered to, the exception being that, owing to a northerly gale at Marseilles, it was considered advisable to postpone the departure for Plymouth until the following day. No trouble whatsoever was experienced, either with the machine or with its Napier "Lion" engines, and a special feature of the cruise was that constant wireless communication was maintained throughout, with R.A.F. and other wireless stations.

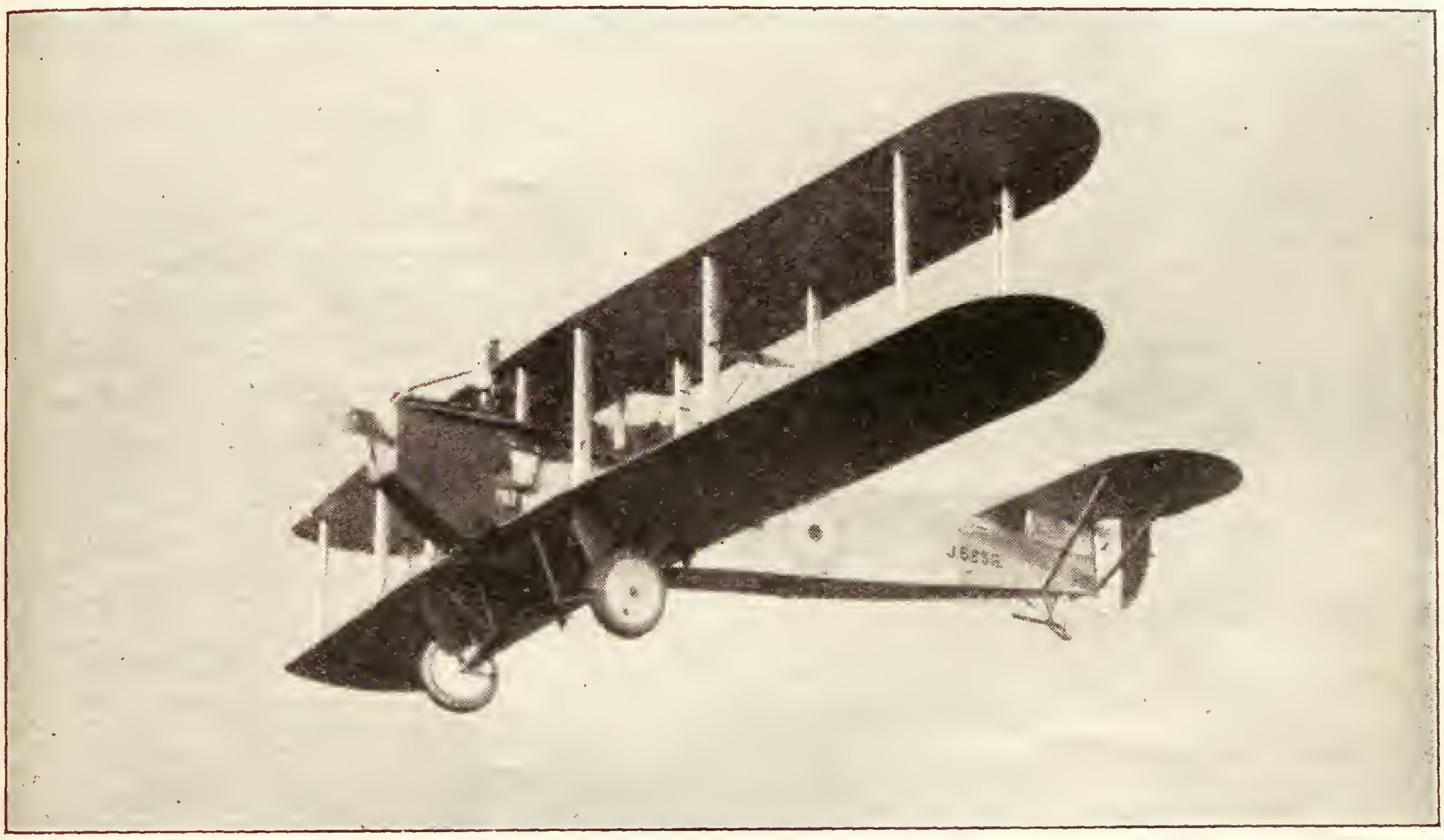
To appreciate to the full these two cruises, it should be kept in mind that they were in no way stunt flights with an elaborate detail organisation, but ordinary Service exercises, with standard machines, carrying throughout a crew of four and full Service load.



The Supermarine "Southampton" at rest on the water.

Owing to the fact that the "Southampton" has, until comparatively recently, been on the Air Ministry's "Secret List," it has been prevented from attempting to beat some of the existing word's records, although there is very little doubt that it could do so. In point of fact, it is believed that the "Southampton" could beat no less than 15 existing records, and establish four new ones not hitherto attempted. It would scarcely be fair to the firm to state at the moment the exact nature of these records, but it is to be hoped that it will now be found possible to make arrangements for the carrying out of a number of flights with this object in view.

The Supermarine "Southampton" has been designed as a



AVRO SINGLE ENGINED BOMBER

SUITABLE FOR DAY OR NIGHT FLYING.

By reason of its exceptional stability, this aeroplane is peculiarly suited to precision bombing, particularly by night. The large space which is available in the fuselage permits the careful arrangement of the bombing and defence positions. The defensive armament has received special study with a view to minimising the necessity for an escort.

MAXIMUM SPEED - 110 M.P.H.
CLIMB - 560 FEET PER MINUTE.
USEFUL LOAD - 4,640 POUNDS.
DURATION OF FLIGHT - SIX HOURS.
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As simple to run as a small car—an entirely practical vehicle, embodying every comfort for passengers and ample space for luggage, easy controls, extreme robustness and a travel capacity of 70-80 miles an hour in any weather; cheaper to maintain than a car. Price, with 27-60 h.p. "Cirrus" engine, £795, and with 30-75 h.p. "Cirrus," £830, ready to fly away from Stag Lane Aerodrome.

["Flight" Photos.]

The illustrations show (1) The Moth, wings folded, in an ordinary garage. (2) The wings spread for flight — the Owner-Pilot can spread or fold the wings with ease in a minute or so. (3) Embarking for the journey —the Moth will fly over 250 miles without refuelling. (4) The start — you need no special clothing and you are efficiently protected from the weather. (5) Well away and showing a clean pair of heels to cars and trains.

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Naval Patrol and Reconnaissance flying-boat, possessing very long range, being very effectively armed, and capable of carrying out bombing operations.

The "Southampton" is a twin-engined flying-boat with a two-stepped circular-section hull of the flexible "Linton Hope" type, the steps being built on as a separate structure. Apart from the generally "clean" lines of the hull, the machine is mainly remarkable on account of its somewhat unusual wing structure.

The whole machine has been designed with a view to eliminate "blind spots," *i.e.*, areas blanketing the gunners' view and field of fire. As a result the "Southampton" is well able to defend itself, and the manner in which the usual "blind spot" behind the tail has been avoided is extremely interesting. To begin with, the tail has been designed as a semi-cantilever, the supporting struts projecting but a very short way out from the tail root. Secondly, the cockpits for the aft guns are placed as far out as possible laterally, and staggered in relation to one another, so that from one or other of the two cockpits there is no blind area beyond a distance of about 50 ft. from the tail.

The hull has been given plenty of freeboard and buoyancy, so that the cockpits and propellers are well clear of the water, and the lines of the hull and planing bottom are such that the machine is exceptionally "clean" when manœuvring on the sea. Very complete marine gear is provided, such as towing bollards, mooring slings, boathooks, sea anchor, etc., so that the machine can be very efficiently handled while on the sea. The forward cockpit is well situated for the purpose of picking up moorings and generally attending to the various operations on the water.

Another feature of the "Southampton" is that no petrol is carried inside the hull, the main petrol tanks being supported under the top plane. In consequence the hull itself is particularly free of obstructions, and in fact it is possible for members of the crew to walk about freely anywhere from bow to stern. There is even ample space in which to sling hammocks for the crew, who can, and do, thus sleep on board. In fact, except for refuelling, the machine is independent altogether, and is a self-contained unit.

The accommodation for the crew is as follows: In the bows is the forward gunner's cockpit, fitted with mounting for Lewis gun. A comfortable hinged seat is provided, which can be swung out of the way and stowed when the gun is being operated. Aft of this is the pilot's cockpit, while behind that again is the cockpit for the navigator. Inside the hull, aft of the navigator's cockpit, is a roomy compartment with chair and table for the navigator, the wireless compartment being still farther aft. Finally, the two rear gunners' cockpits are situated quite a long way aft of the wings, where the field of fire is exceptionally clear.

The total loaded weight of the "Southampton" is 14,300 lbs. (6,500 kgs.), and clearly the disposable load can be arranged in any way suitable to the purpose of the machine. When used as a bomber the "Southampton" carries the following load: Crew of four, 720 lbs. (327 kgs.); armament and military equipment, 2,130 lbs. (968 kgs.); 300 gallons of petrol, 2,220 lbs. (1,000 kgs.); 22 gallons of oil, 220 lbs. (100 kgs.). Total load, 5,290 lbs. (2,405 kgs.). When the machine is used for reconnaissance the load is composed as follows: Crew of five, 900 lbs. (410 kgs.); armament, etc., 1,130 lbs. (514 kgs.); 400 gallons of petrol, 2,960 lbs. (1,345 kgs.); 30 gallons of oil, 300 lbs. (136 kgs.); total load, 5,290 lbs. (2,405 kgs.). For bombing the range has been reduced to enable 1,000 lbs. (455 kgs.) of bombs to be carried. Fitted with two Napier "Lion" engines, using 0·65 pints of petrol per horse-power per hour, the "Southampton" has the following officially observed performance: Maximum speed at sea level, 107·7 m.p.h. (173 km./h.); rate of climb at sea level, 610 ft./min.; ceiling, 14,000 ft. (4,260 m.); minimum speed, 56 m.p.h. (90 km./h.); optimum cruising speed, 85 m.p.h. (137 km./h.); range at cruising speed (400 gallons of petrol), 680 miles (1,100 kms.).

The Supermarine "Southampton" could, of course, be converted into a commercial machine, when, by allowing for a crew of two, wireless instruments, marine gear, seating, etc., 800 lbs. (364 kgs.), there would be a disposable load of 4,490 lbs. (2,040 kgs.) that could be arranged in any combination desired; as, for instance, 400 gallons of petrol, range 680 miles (1,100 kms.); duration, 8 hrs.; number of passengers with luggage, 6. Or, petrol, 300 gallons; range, 510 miles (820 kms.); duration 6 hrs.; and 10 passengers. Or, 200 gallons of petrol, range 340 miles (550 kms.); duration, 4 hrs.; and 14 passengers. These figures are all based upon a cruising speed of 85 m.p.h. (137 km./h.). This is for a total loaded weight of 14,300 lbs. (6,500 kgs.). For long-range work it would be permissible to "overload" the machine up to a total loaded weight of 15,700 lbs. (7,140 kgs.), when, by reducing the weight of crew, armament, etc., the range would be greatly extended.

(*To be continued.*)

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS

COMMITTEE MEETING

A Meeting of the Committee was held on Wednesday, November 10, 1926, when there were present:—Brig.-Gen. Lord Thomson, C.B.E., D.S.O., in the Chair; Air Vice-Marshal Sir W. S. Brancker, K.C.B.; Mr. Ernest C. Bucknall; Lieut.-Col. M. O Darby; Lieut.-Col. John D. Dunville, C.B.E.; Mr. E. J. B. How,; Wing-Commander T. O'B. Hubbard, M.C., A.F.C.; Lieut.-Col. Sir Francis K. McClean, A.F.C.; Lieut.-Col. M. O'Gorman, C.B.; Mr. F. Handley Page, C.B.E.; and the Secretary.

Election of Members.—The following New Members were elected:—

Major Ralph Harrison Archbald.
George Edward Heyl.
Richard Cecil Joynson-Hicks.
James Jeffs.
Henry Warren Lambert.
Bernard More Troughton Shute Leete.
Flight-Lieut. William Geoffrey Meggitt.
Lieut.-Col. Frederick Frank Minchin.
The Duke of Nemour.
St. John Tempe Plevins.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

8040.	Reginald Clarence Presland	5th Oct., 1926.
*8041.	Harold Blake Holdway	30th June, 1924.
8042.	Charles William JohG Allen	9th Oct., 1926.
8043.	Alan Harry Maxwell Lees	21st Oct., 1926.
8044.	George de Horne Vaizey	21st Oct., 1926.
8045.	Sicele O'Brien	20th Oct., 1926.
8046.	Jack Cuthbert Larking	27th Oct., 1926.
8047.	Joseph Barros	29th Oct., 1926.
*8048.	Joseph John Hayes	15th Nov., 1918.
8049.	Julio Fernandes Costa	31st Oct., 1926.
8050.	Harry Ellis	1st Nov., 1926.
8051.	Edward Roy King	3rd Oct., 1926.
*8052.	David Moncur	10th Nov., 1926.

* Granted on Royal Air Force Graduation Certificate.

Vacancy on the Committee.—Sir Alan J. Cobham, K.B.E., A.F.C., was unanimously elected to fill the vacancy on the Committee.

F.A.I. Rome Conference.—Lieut.-Col. M. O'Gorman, C.B., reported fully on the Conference of the Federation Aeronautique Internationale held at Rome on the 10th-16th October, 1926.

A unanimous vote of thanks was passed to Lieut.-Col. O'Gorman for attending the Conference on behalf of the Royal Aero Club.

F.A.I. Gold Medal.—It was unanimously decided to put forward the name of Sir Alan J. Cobham for the award of the F.A.I. Medal for the year 1926.

Sub-Committee.—The reports of the following Sub-Committees were received and adopted:—Finance Committee, Racing Committee, House Committee, Joint Standing Committee (R.Ae.C. and S.B.A.C.).

MEMBERSHIP OF THE ROYAL AERO CLUB

Intending members are reminded that they can join the Royal Aero Club now, and their first subscription carries them to December 31, **1927**. There is no entrance fee, and the rates of subscription are £6 6s. per annum and £3 3s. per annum in the case of officers of the Royal Air Force, Royal Air Force Reserve, Auxiliary Air Force and Air Ministry Departments.

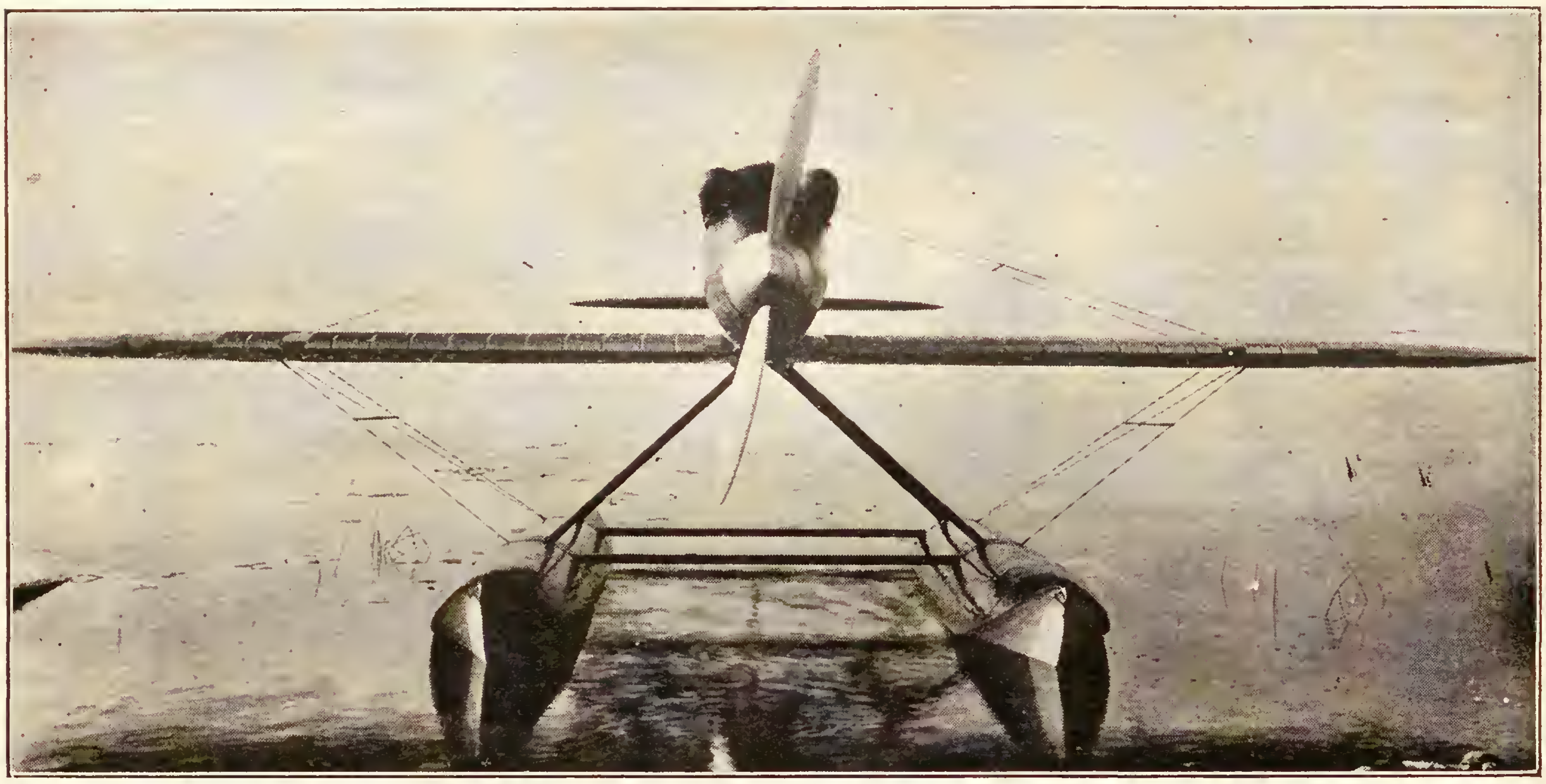
Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

THE INTERNATIONAL SCHNEIDER CUP SEAPLANE RACE

A Remarkable Italian Victory at 246·496 m.p.h.

THE classic Schneider Cup contest has, after all, been given a further lease of life, and the cup has found a temporary (?) home in Europe once again. For the result of this year's—the ninth—contest, which was decided in Hampton Roads, U.S.A., after three postponements, on November 13, has to be recorded a splendid victory for Italy, Maj. Mario di Bernardi, one of the Italian team, winning with an average speed of 246·5 m.p.h., and thus beating all previous records. This means that Great Britain—a non-entrant this year—has a chance of winning the next race, which will be held, probably in Venice, in 1928. It should be pointed out here that at a recent meeting of the F.A.I. it was decided that, in the event of America not winning this year's contest, when the cup would be open to further contest, subsequent races should be held once in two years and not annually.

Although the actual contest on Saturday last was got through without serious accident, this year's contest has not, unfortunately, passed without tragedy. During preliminary trials or tests in connection with the Schneider Cup race, three pilots lost their lives. Marchese Centurione, one of the Italian entrants, was killed at Schiranna air station (Italy) on September 21, when testing one of the Macchi racers. Two American entrants also lost their lives, one, Lieut. F. H. Conant, being killed whilst flying, in a service machine, from Washington to Norfolk, after having previously accomplished an unofficially recorded flight of over 250 m.p.h. on one of the Curtiss racers.



THE 1926 SCHNEIDER CUP WINNER : The Macchi twin-float mono-seaplane, fitted with a Fiat 800 h.p. engine.

The course this year was a triangular one of 50 kms., extending from the southern end of Newport News wharf to the northern end of the Naval Operating Base, Hampton Roads, thence north-east to a mark 15·9 kms. away, and back to Newport News. This course had to be covered seven times, giving a total distance of 350 kms. The race itself, as before, was preceded by eliminating trials.

October 24 was the original date fixed for this year's race, but at the request of Italy—who was unable to get ready in time—it was postponed to November 11. On November 10 a start was made with the eliminating trials, weather conditions being far from ideal, and Capt. Ferrarini (Italy) made a plucky flight in a bad squall. Soon after starting the wind rose to about 40 m.p.h., and a very heavy downpour of rain caused some anxiety to be felt as to the possibility of the pilot being able to come through with safety. However, Capt Ferrarini managed to effect a good landing and taxied safely to shore.

In the afternoon Lieut. Cuddihy, one of the U.S. entrants, ascended and covered the course at 240 m.p.h. It may be of interest to note that this pilot, on November 8, established an unofficial record of 256 m.p.h. on his machine, the Curtiss R.3c-4. Weather conditions were so bad on November 10, however, that it was decided to again postpone the race until November 12–13.

One machine was "eliminated" in the trials on the 12th, Lieut. Tomlinson nose-diving into the bay on the Curtiss-Packhard R3C-3 racer. He was submerged for several seconds, but managed to free himself and escaped unhurt. The other entrants passed the trials successfully.

Thus, for the race itself on Saturday, the following presented themselves for the fray: Italy—Maj. Mario di Bernardi, Capt. Arturo Ferrarini, and Lieut. Adriano Bacula, all flying Macchi M39 monoplanes fitted with 800 h.p. Fiat engines. America—Lieut. Cuddihy on Curtiss R3C-4 biplane (700 h.p. Curtiss V-1550), Lieut. C. F. Schilt on Curtiss R36-2 biplane (600 h.p. Curtiss V-1400)—last year's Schneider Cup winner—and Lieut. Tomlinson on the reserve Curtiss.

Maj. Bernardi was an easy winner, his average of 246·496 m.p.h. for the course being well above any of the other efforts; on his third and sixth laps he touched 248·5 m.p.h.

Lieut. Schilt (U.S. Marines) came in second with an average of 231·363 m.p.h. (less than last year's winner), and Lieut. Bacula obtained third place for Italy with 218 m.p.h. Lieut. Tomlinson was the only other to finish—so he came in fourth at the terrific speed of 137 m.p.h.! Capt. Ferrarini, who completed three laps at 238 m.p.h., was forced down by engine trouble, while Lieut. Cuddihy also had to come down after completing six laps at an average speed of 239 m.p.h.

The Italian victor and his companions were enthusiastically cheered at the conclusion of the race, and a cable was sent to Sig. Mussolini by the U.S. Government offering congratulations to the Italian team's fine sportsmanship and ability. The Schneider Cup was presented to the Italian victor at a banquet to the Italian team on the night of the race.

As regards the machines in this year's contest, the three Italian machines were of similar type—twin float monoplanes, with 800 h.p. Fiat engines, a general idea of which may be obtained from the accompanying illustration. The three American machines were all twin-float Curtiss racing biplanes, and were, in fact, the same machines as were flown in the contest last year, and differ only in minor details and the engines fitted. One of the latter is the new Curtiss V-1550—a development of the D-12 and V-1400 engines. A second machine was fitted with the new special Packard V-1500 geared engine developing 700 h.p., whilst the third was much the same as when it won the Schneider Cup last year.

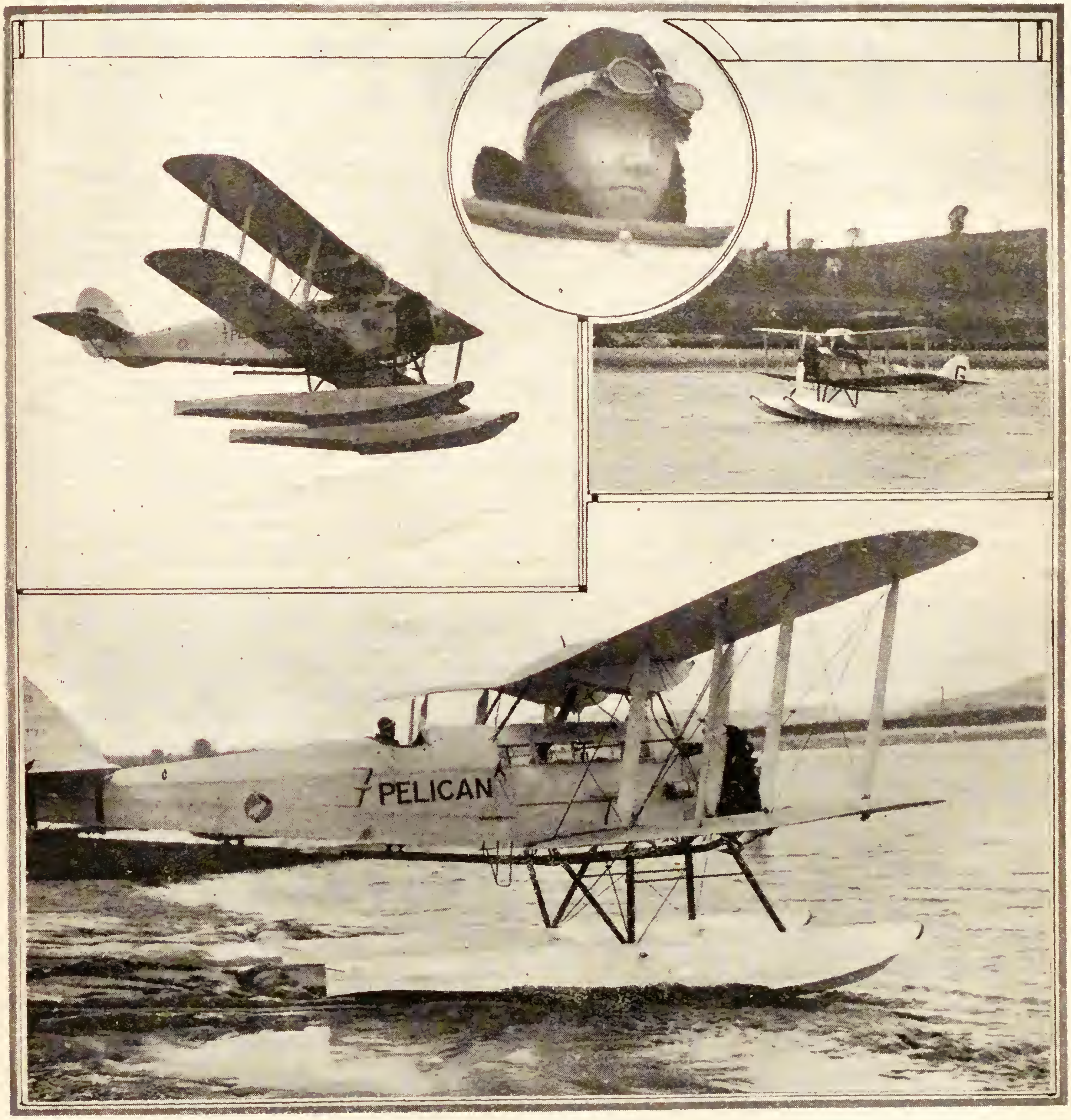
EAST AFRICAN AIR LINE

By way of celebrating the " birth " of the first Commercial Flying Service between Khartoum and East Africa, organised by the North Sea Aerial & General Transport Co., Ltd., a distinguished party travelled, on November 15, to Messrs. Short Bros'. Aeronautical Works at Rochester, on the banks of the Medway, to attend the christening and launching of the first seaplane to be used in the service. The actual ceremony of naming " The Pelican " was performed by Lady Beatrice Ormsby-Gore, the wife of the Under-Secretary of State for the Colonies, Mrs. T. H. Gladstone, mother of Capt. T. A. Gladstone, afterwards presenting Lady Beatrice with a silver salver on which a map of Africa was engraved, showing the air route along the White Nile. The piloting upon the occasion was in the hands of Capt. H. S. Broad, who, after " slithering " the graceful little craft off the river mud, gave a short and convincing exhibition of the manœuvrability and wonderful efficiency of the machine.

" The Pelican " is a four-seated D.H. 50, fitted with a 420 h.p. Radial Bristol Jupiter, a Fairey-Reed metal airscrew, and special Duralumin floats by Short Bros., and built to the order of the North Sea Aerial Transport Co., who are allied with the Blackburn Aeroplane Co. The enterprise is mainly due to the work and organisation of Capt. Gladstone, whose long view is likely to bear a rich harvest, not only we hope for the Company, but for Imperial inter-communication.

At a subsequent luncheon at the old Bull Hotel, of Charles Dickens' fame, at which Mr. R. Blackburn presided, the Rt. Hon. Ormsby-Gore read a letter from Sir Samuel Hoare, who was unavoidably, through illness, prevented from being present, in which Sir Samuel said :—

" This project is one which seems to me to be of the most far-reaching importance alike to the Air Ministry and the Colonial Office. From the broad aspect of Imperial air communications, this service is the first link in what will



[" Flight " *Photographs*

" A WONDERFUL BIRD IS THE PELICAN " : Intended for use on the Khartum-Kenya air route, the first D.H.50 seaplane, with Bristol " Jupiter VI " engine, was tested on Monday last at Rochester by Capt. Broad. In the lower picture Broad is seen taking off from the mud, while above the machine is seen alighting and in flight. The inset shows Capt. Broad. The floats, made of Vickers Duralumin, were designed and built by Short Brothers.

[" FLIGHT " *Photograph*

CHRISTENING THE "PELICAN": Lady Ormsby-Gore breaking a bottle of champagne on the float of the D.H.50 seaplane which is going out to Africa.

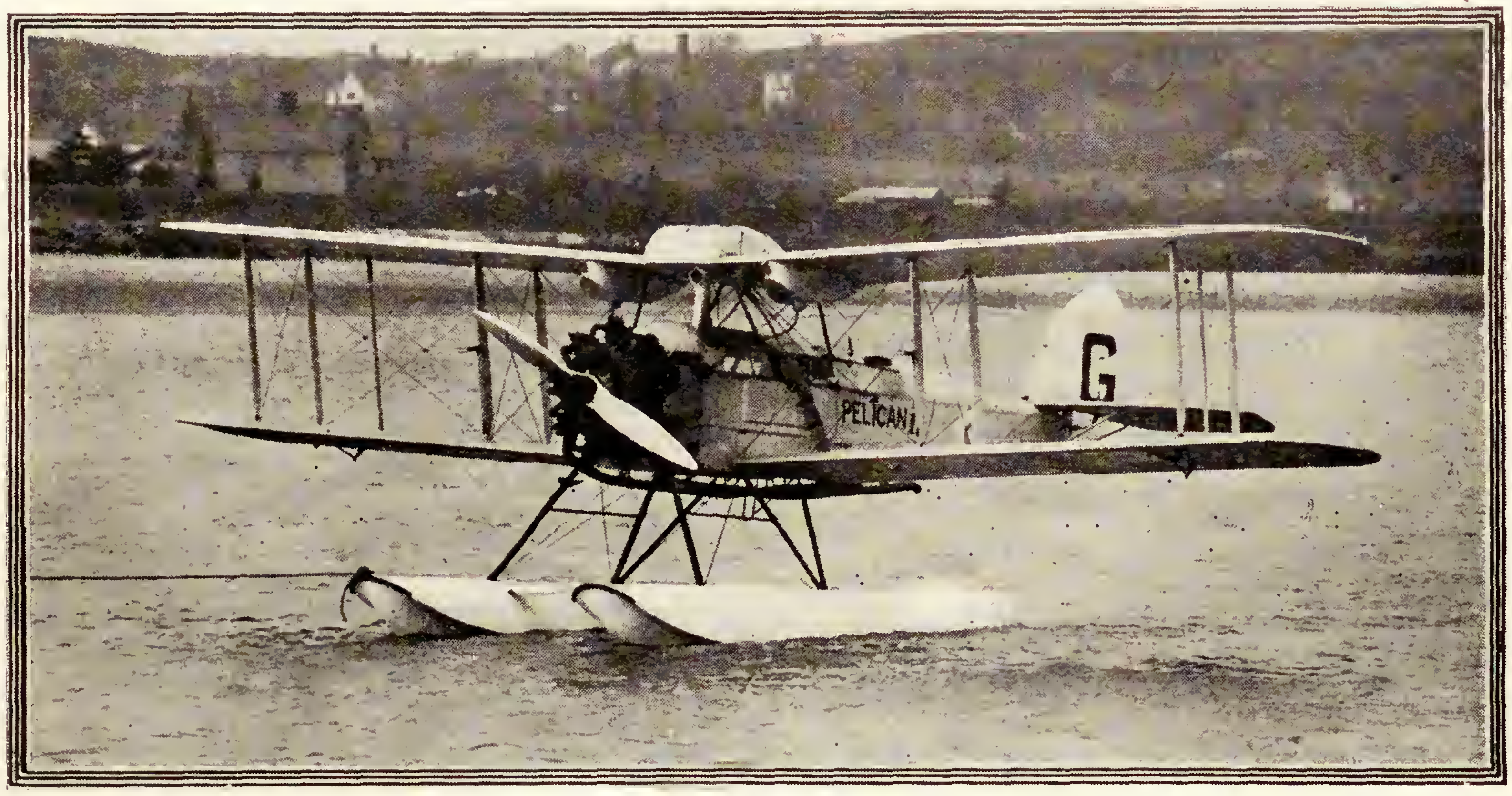
ultimately be one of the most important routes of the Empire, that from Cairo to the Cape, a route which should be of first-class strategic, as well as commercial, importance."

Mr. Ormsby-Gore, in wishing success to the new enterprise, said it was only today we had laid the foundation to what would lead to practical results. It would establish the certainty that up the Nile was the most hopeful commercial, as well as strategical, route to Africa. Its inauguration was due to the present company's generosity through the enterprise of Capt. Gladstone in establishing the route in conjunction with the Governments of Kenya, Uganda and the Soudan.

Sir William Gowers, Governor of Uganda, speaking on behalf of the other Governments interested, said one of the most promising signs was that the undertaking had the whole-hearted support of both the official and unofficial sides. Every improvement in transport in Africa tended to consolidate Imperial interests in the country. Roads and railways, by reason of their cost and time in construction, were out of the question and aviation was their only hope. Great Britain, he said, had been so far very backward in pushing along aviation, whereas France and Belgium had both gone forward and had established themselves in that respect. But the British had, nevertheless, performed wonderful pioneer work in Africa which would later bear fruit. After detailing some of the earlier flights, Sir William said he hoped the present organisation would be supported by the Belgian Government for their Congo possessions—it would certainly be patronised by them—although the Belgian Government were a little shy, as they wondered why the British Government were not supporting their own people. They were, however, all convinced that civil aviation in Africa must come, and this air service was the first attempt to establish a commercial and economic air line in East Africa with a regular service. Just as new railways and roads were not immediately directly profitable, so he thought the value of the air line must be measured by the development it brought with it. At least 10 days would be saved by the present scheme in mails between London and Kisumu, and with an air line extending north to Cairo the time saved would amount to a fortnight.

Sir Humphrey Leggett, Chairman of the East African section of the London Chamber of Commerce, in viewing the enterprise from the commercial point of view, said that at present East Africa was only 10 days distant from India, and it was essential to British trade to deal with this adverse time balance which existed in communications with the business centres of Liverpool and Manchester, the value of which could not be overrated.

Colonel I. A. E. Edwards, C.M.G., of the Civil Aviation Department,, Air Ministry, said that if we are to progress and maintain our position, we must tighten up our connections by means of the air routes. The development of Imperial Air Services was the concern of every man, woman and child in the Empire, quite apart from the political aspect. Without adequate capital, we could not expect adequate emigration to our widely-flung possessions. The cost of aviation services should not be made so much of. In India,, a recent estimate for an air organisation, over a 2,000-miles route, compared in cost with another estimate which would provide a railway service over 30 miles only. If the air



[" FLIGHT " *Photograph*

BRITISH AIR LINE IN AFRICA : This photograph shows the de Havilland 50, fitted with a Bristol " Jupiter," which is to be used for the new air line operating between Khartum to Kenya. The Duralumin floats were built by Short Brothers, of Rochester. Note the extra petrol tanks.

The Navy of September, 1926, says—

"IN the last seven months Napier engines have flown from Cairo to Cape Town, and back to England ; from Plymouth to Alexandria and back; from Spain to Buenos Aires ; covering, on these flights, nearly 100,000 engine miles. Such a record of consistent reliability in long distance flights has never been approached by any other engine, and it is gratifying to see how the Napier has so fully proved to the world the reliability of British aero engines."

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were used to the same extent as the railways, the cost would be infinitesimal in comparison. Our "nursery" services had taught us so much and given us such experience, that we were now better able to establish air routes successfully. In this respect, Captain Gladstone had persevered in this particular enterprise, and no man could be better fitted than he to carry through to success such an undertaking as they had that day helped to inaugurate.

Captain Gladstone said that all they asked was for them to be given the opportunity of proving what they could do by testing the services in person, and by despatch of goods.

Mr. Oswald Short, for his firm, said he was proud to have been associated in the enterprise, and with the other firms concerned, viz., the De Havilland Co., the Blackburn Co., and Fairey Co., who had supplied the air-screw.

Lord Cranworth, in congratulating the directors of the company, said that after 18 months spent in travelling from East Africa and back, he could feelingly say, any attempt to shorten that would be a benefit to the Empire.

The service is to start in January, and we understand that the Royal Air Force in Egypt have arranged to make some connecting flights from Khartum to Cairo, and the South African Air Force will probably make at least one flight north to connect from Cape Town with the Kisumu-Khartum service.

As previously mentioned in FLIGHT (December 24, 1925), the service will be once weekly in each direction and the route follows the White Nile from Khartoum to Malakal, thence via Mongalla, Butiaba, Jinja, to Kismu, on Lake Victoria—a total distance of 1,400 miles.

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

FLYING was only possible on three days during the week ending November 14, owing to unfavourable weather. The total flying time was 12 hours.

The following members were given instruction:—C. E. Murrell, Lady Bailey, G. H. B. Madocks, H. Spooner, H. Solomon, J. G. Crammond, A. Southgate, F. C. Elford, Miss Taggart, G. Wallcousins.

The following flew solo:—N. Jones, G. H. Craig, S. O. Bradshaw, Lady Bailey, O. J. Tapper.

The following were given joy rides:— L. C. Davey, S. H. J. Garne, Mrs. Glaskie, Miss Wilson, J. J. Hofer.

The Hampshire Aeroplane Club

REPORT for week-ending November 11.—Total flying time, 4 hrs. 38 mins. Instruction flying, 3 hrs. 45 mins. Solo flying, 53 mins.

The following Members received instruction:—Messrs. Graham, 2 hrs. 20 mins.; Stokes, 35 mins.; Nicholson, 10 mins.; Bound, 10 mins.; Courtney, 15 mins; Shepherd, 25 mins.

The following members flew solo:—Mr. Perfect, 28 mins.; Flying Officer Clarkson, 10 mins., Lieut. Graham, 15 mins.

Capt. Bailey, of Imperial Airways, has kindly consented to act as examiner for the technical examination of applicants for Royal Aero Club licences, and has been approved for that office.

The club has arranged to hold the first annual dinner at the South Western Hotel, Southampton, on Thursday, December 2, when the President, Lord Louis Mountbatten, will preside.

Lancashire Aero Club

REPORT for week ending November 13:—The weather permitted flying on Sunday and Friday. Total time for the week 18 hrs. 35 mins., made up as follows:—

Dual with Messrs. Brown, Cantrill and Scholes:—Twemlow, 1 hr. 20 mins.; Crosthwaite, 45 mins.; Cohen, Costa, Dickinson, McNair and Miss Brown, 35 mins. each; Anderson, 40 mins.; Abdalla, 30 mins.; Newton and Wade, 25 mins. each; Moore, Dobson and Powell, 20 mins. each; Goodyear, Gattrell, Hargreaves, Leigh and Miss Emery, 15 mins. each.

Solo:—Messrs. Costa, 2 hrs. 25 mins. Goodfellow and Williams, 40 mins. each; Leeming, 35 mins.; Lacayo, 10 mins.

Joy-rides. With Mr. Leeming:—Miss Shiers, 40 mins; Messrs. Mitchell, 35 mins; Jones, 30 mins; Powell, 10 mins. With Mr. Lacayo:—Mr. Benson, 1 hr. 35 mins. With Mr. Brown:—Miss Barbour, 10 mins.

Test flights, 1 hr. 10 mins.

The large wood on the aerodrome is to be cut down, and the club is divided into factions over it. One party (which includes all the pupils who are tired of being told that they can't have instruction on landings because the wind is blowing South-west across the road) cannot praise too highly the broad-minded and public-spirited policy of the Avro Company. The other party (which includes all those who have been in the habit of strolling through the aforesaid wood with a gun on the look-out for the odd bird) strongly condemns the proposal as a piece of sheer vandalism, and considers that a public protest should be raised against the desecration of one of the beauty spots of East Cheshire. There is no division of opinion, however, upon Avro's proposal to put a light steam-roller over certain parts of the 'drome, where the surface is particularly bad. A few days rolling with the ground in its present soft state should do a tremendous amount of good.

We appreciate the sporting spirit shown by the Yorkshire Club in last week's notes and thank them for it. It does seem a pity that G-EBNN should be doing nothing, but if they would care to loan the rest of her to one of our members we have a pilot available at the moment who is most anxious to do cross-country flying, and who would gladly (provided he was allowed to land as often as he liked) follow Messrs. Stack and Leete round the world if need be, with a view, of course, to bringing back any of the missing parts found in their possession!

Midland Aero Club, Ltd.

REPORT for week ending November 13.—The total flying time was 5 hrs. 2 mins.

The following members had dual instructions:—A. B. Gibbons, C. Fellowes, G. Aldridge, H. Smith.

The following members made solo flights:—A. B. Gibbons, R. L. Jackson, H. J. Willis, E. J. Brighton, C. L. Knox, W. Swann, J. Brinton.

On Sunday Mr. Gibbons made his solo flight, which was satisfactorily carried out.

A week of very high winds restricted the hours flown.

The Newcastle-upon-Tyne Aero Club

REPORT for week ending November 14. Total flying time, all by members, 3 hrs. 15 mins. Very bad weather was experienced during the week and, in addition, LX. has been taken off service for some minor repairs and LY will only go back to service at the beginning of next week.

The following members flew with passengers. Dr. Dixon with Mr. Wilson; Mr. Forsyth Heppell with Mr. Wilson and Mr. J. M. Kennedy.

Mr. Irving put in some more solo flying, and is now ready for his tests. He flew for 75 mins. during the week.

The Yorkshire Aeroplane Club

REPORT for the week ending November 12. Total flying time, 9 hrs. 45 mins. as follows:—

Solo: 4 hrs. 15 mins. Dual instruction, 5 hrs. 30 mins. The soloists were:—Messrs. L. S. Dawson, Lax, Mann, Norway, Watson and Wood. The following received dual instruction:—Messrs. Gratwick, Mann, Oglesby, Swift, Wilson and Capt. Beaumont. The number of flights totalled 25. Flying has only been possible on four days this week on account of the weather. We have given up the unequal struggle to frame this remark differently.

The total time flown for the first three days when flying took place this week was, curiously enough, precisely the same as last week; but Friday's figure of 1 hr. 50 mins. brought the total up to that already stated.

Mr. Mann was lauched on Saturday, and put up a very good show. On Sunday no less than eight Members stood up before Mr. Stevenson, and successfully recited their piece to qualify for an "A" licence. Mr. Loton has been appointed examiner for the flying test, and six members are now waiting for his attentions.

Miss Woodhead, after 8½ hours' dual, is now waiting for weather to go solo. We claim this as a Club record for an "*ab initio* lady." Possibly the Newcastle Club hold the "slow but sure" record for a member of the fair sex, as we understand one took some sixty hours to reach the first solo stage. Will anyone dispute these claims?

ALL THE WORLD'S AIRCRAFT*

THAT useful volume of reference, "All the World's Aircraft," has once more made its appearance, in its 1926 form. All the improvements introduced in last year's edition have been standardised and, to a certain extent, still further improved. In short, the present edition contains considerably more information, and is very much more complete, than any previous issue. In the "Historical" section—which, it should be explained, deals with the history of aviation in each country during the preceding year, and *not*, except where necessary, with the early history—information has in most cases been obtained from official sources, so that besides being somewhat fuller this time, it may be regarded as authentic and reliable. As pointed out in the preface, a fairly detailed history, over a period of several years, of the progress made in aviation by any particular country, may be obtained by studying successive volumes of "All the World's Aircraft."

Many new types are to be found in the section dealing with aeroplanes produced in different countries, and, in spite of the difficulty in obtaining information from some countries and aircraft firms, the information in this section is certainly very complete. The section devoted to helicopters is almost conspicuous for its absence, for it only contains a reference—rather, we think, on the brief side—to the Cierva Autogiro.

The next section deals with aero engines, and this, again, is full of interesting and up-to-date information. Then follows the comparatively short section devoted to airships; possibly in the near future this section will have to be considerably enlarged.

Other sections in this volume include a list of all the world's air lines and another list giving the noteworthy flights of 1925-26. At the end is an alphabetical index, from which, by means of an ingenious system of cross-reference, any type of aeroplane, engine or airship may readily be found.

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* "All the World's Aircraft", Compiled and Edited by C. G. Grey Sampson Low, London. Price £2 2s.

An Aerial Financier

MR. LOEWENSTEIN, the Belgian financier, makes good use of his privately-owned aeroplanes for pleasure as well as business. On November 8, he flew in one of his machines from Croydon to Croxton Park, Leicestershire—where he is constructing a private aerodrome—and then motored to his hunting quarters at Thorp Satchville in order to attend the Quorn Hunt.

FROM THE FOUR WINDS

The French Flight to Madagascar

ONE of the two French flying boats which are making a cruise from France to Madagascar has met with a slight accident, which has caused a delay, although it is hoped that repairs by the crew will be possible. This is the C.A.M.S. flying boat, which was damaged at Gaya on the Niger. The other machine, a Liore and Olivier, with (French) Bristol "Jupiter" engine, has arrived safely at Stanleyville in Belgian Congo, having covered up to date something like 9,300 kms. (5,775 miles), leaving approximately another 4,000 kms. (2,480 miles) still to be flown.

French Line to South America

IN French aviation circles it is now regarded as almost certain that the necessary financial support of 7,000,000 francs will be voted for an air line between Dakar, in West Africa, to Pernambuco, in South America. The line is to be operated by the Latecoere Company, who already run the service to Dakar, flying boats being used from Dakar to the Cape Verde Islands and from the island of Noronha to Pernambuco, fast marine vessels operating over the long sea section between Cape Verde and Noronha. If all goes well, it is hoped to have the service in operation in July, 1927.

Ambition!

FROM time to time rumours get about to the effect that this or that foreign engineer has designed a giant flying machine. One of the most ambitious projects which have come to our notice so far owes its origin to Oberingenieur R. Klamt, of Breslau, who suggests the construction of a monoplane flying boat with three boat hulls, a span of 140 m. (459 ft.), a wing area of 2,750 sq. m. (30,000 sq. ft.), a total loaded weight of 55,000 kgs. (121,000 lbs.), driven by five engines of 3,000 h.p. each, and carrying 150 passengers. Why not go the whole hog and stick a pair of wings on the *Leviathan*?

A Mexican Air Mail

A CONTRACT, spreading over a period of ten years, has just been arranged between the Mexican Government and the Compania Mexicana de Aviacion for the establishment of a mail and passenger air service between Mexico City, Tampico and Tuxpam. As the Fairchild Aviation Corp., of New York, is the present organisation of the above Mexican company, it is probable that the equipment of the new service will consist of Fairchild FC-1 cabin-monoplanes, fitted with Fairchild-Caminez or Wright "Whirlwind" engines. In the contract is a clause in which the Mexican Government guarantees that no other commercial air service will be allowed to operate between the points allotted to this organisation, but other companies will be permitted to use the Mexican aviation company's routes, aerodromes, etc., provided they turn over to that organisation 50 per cent. of their tariffs. All passengers are to be carried at 40 cents (Mexican) per km. for the first 400 kms. and 30 cents for the next 400 kms., and for special trips, with a minimum distance of 100 kms., double this rate will be charged. For the carrying of first-class mail a charge of $10 per gross kilogram will be allowed, on the understanding that the Post Office Department is not obliged to provide any given amount of mail other than that the public may desire to send at the rate of 20 cents per 20 grm. or fraction thereof. The Mexican aviation company has been awarded full wireless rights for the routes involved; the concession further provides tax exemption and the free use of available government-owned lands for aerodromes—the rates that may be charged, however, are prescribed—and the company is also required to contribute a certain percentage of its earnings to a fund for regular inspection by government experts of its aerial transport equipment. The company has been required to deposit $11,650 in the Bank of Mexico as a guarantee of fulfilment of all obligations assumed.

Swiss Air Services

THE 14 air lines operating in Switzerland closed down for the winter last month. During the past season these lines carried 6,000 passengers, 65,000 lbs. of goods, and 31,000 lbs. of luggage.

Flying Over Mt. Everest

THE French pilot, M. Callizo, who recently established a world's altitude record of 39,586 ft., is, it is reported, to attempt to fly over Mount Everest, which is 29,140 ft. high.

"Los Angeles" Moored to Ford Mast

THE U.S. rigid airship "Los Angeles," paid a visit to Detroit last month, and on arriving at the Ford Airport, Dearborn, was successfully moored to the new mast there, to which we referred in a recent issue of FLIGHT. The "Los Angeles" left Lakehurst at 11.5 a.m., on October 14, with a crew of 44 men together with Admiral Moffett and three passengers. After a flight of over 16 hours, during which bad weather patches had to be dodged, the airship arrived at Dearborn.

The Prince of Wales Receives Sir Alan Cobham

ON November 16, the Prince of Wales received at St. James' Palace Sir Alan Cobham, and extended to him his best wishes for an enjoyable trip in America—Sir Alan and Lady Cobham left Southampton in the *Homeric*, on November 17. His Royal Highness had a long talk with Sir Alan regarding the latter's flying experiences, and was particularly interested in the African and Australian flights.

Sir Alan Cobham Joins Warwick Wright, Ltd.

SIR ALAN COBHAM has joined the Board of Directors of Warwick Wright, Ltd., the well-known Automobile specialists, of New Bond Street. Col. Warwick Wright, D.S.O., is himself one of the pioneers of aviation, and both Sir Alan and he are enthusiasts in all matters affecting transport, so a combination of two such strong personalities should augur well for the future of this concern.

An Aerial Police Force

WHAT is said to be the first regularly appointed and organised squad of aerial police was formed last month, when Sheriff Traeger, of Los Angeles County, Cal., administered the oath of office to five members of the Aero. Corporation of California. It would seem to be necessary, too, for just recently there have been reports of two aeroplanes having been stolen from their owners' aerodromes in different parts of the States!

Brazilian Atlantic Flight

SEN. DOS BARROS, the Brazilian airman, who is making, a flight from Genoa to Brazil, on a Savoia S55 flying-boat arrived at Praia, Cape Verde Islands, on November 11.

U.S. Airmen Crash into Mountain

Two U.S. Airmen, lieuts. K. M. Hegardt and H. W. Downing, when flying in a D.H. biplane, on November 8, lost their way in a fog, and crashed into a mountain ridge near Gettysburg, Penn., and were killed.

Coste and Rignot Back in Paris

THE French airmen Coste and Rignot, who broke the world's non-stop long-distance flight record by flying from Paris to Djask (or Jask), on the Gulf of Oman (3,143 miles), returned to Paris on November 11. They started on their return flight from Calcutta, on November 4.

Honour to Fallen Airmen

TRIBUTE was paid, on November 11, to the memory of fallen members of the Royal Air Force by a simple ceremony of laying wreaths at the foot of the Memorial on the Victoria Embankment. In the absence of Air Chief Marshal Sir Hugh Trenchard, the principal wreath, in the form of the wings of the R.A.F., worked in red poppies, with a blue centre of everlasting flowers, was placed by Vice-Marshal Sir Philip W. Game.

Air Mail Pilots Captured by Brigands

Two French Air Mail 'planes, flying on the Casablanca-Dakar route, were forced to descend near Cape Bojador—on the Barbary Coast—recently and were immediately surrounded by a band of wild Moorish horsemen. The latter burned the aeroplanes, mails and goods, and carried the pilots into captivity.

French Pilot Killed

THE French pilot, Albert Bichel, was killed at Angers on November 15 when taking part in a landing competition.

Elliott's Assassin Sentenced

THE Arab tribesman who fired at Sir Alan Cobham's machine during the outward flight to Australia, and fatally wounded Mr. A. B. Elliott, who was accompanying Sir Alan as mechanic, was found guilty of manslaughter at the Nasiriyal Court Sessions on November 15. He was sentenced to five years' rigorous imprisonment.

By "Moths" to the East

CAPT. T. N. STACK and Mr. B. S. Leete set out from Stag Lane aerodrome on November 15 on the first stage of their sporting Eastern trip. Capt. Stack was flying D.H. "Moth" G-EBMO, the King's Cup winner, and Mr. Leete was on "Moth" G-EBKO. They arrived safely at Lympne, but were held up here by bad weather.

Food by Air for Stranded Motorists

PILOTS of Royal Air Force aeroplanes have dropped dates and other foodstuffs for stranded passengers in the cross-desert motor-car convoys from Beirut (Syria) to Baghdad, as the cars have been stuck fast for over a week in mud caused by exceptionally heavy rains.

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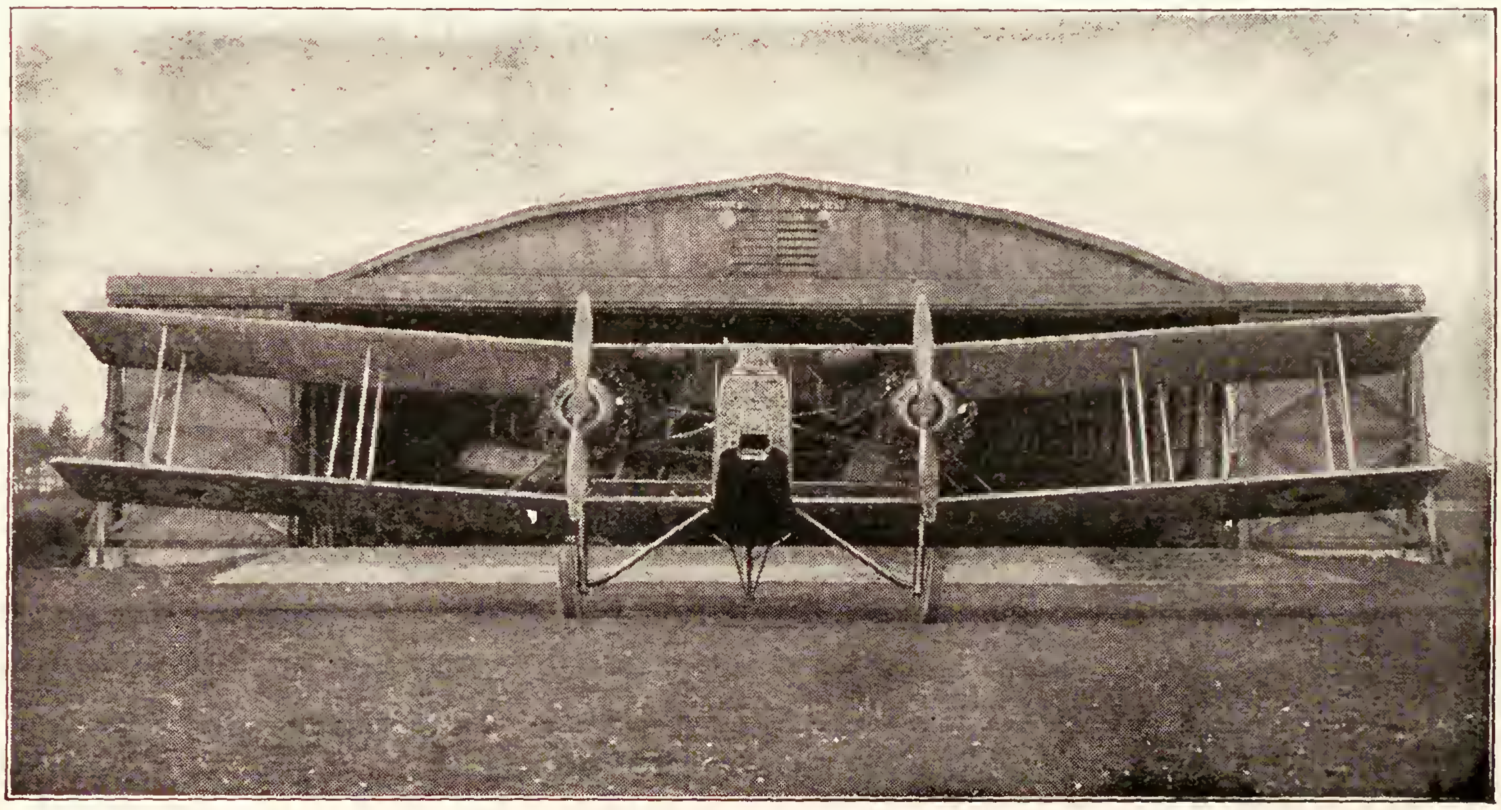

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— DIAGRAM MAP OF GREAT BRITAIN —

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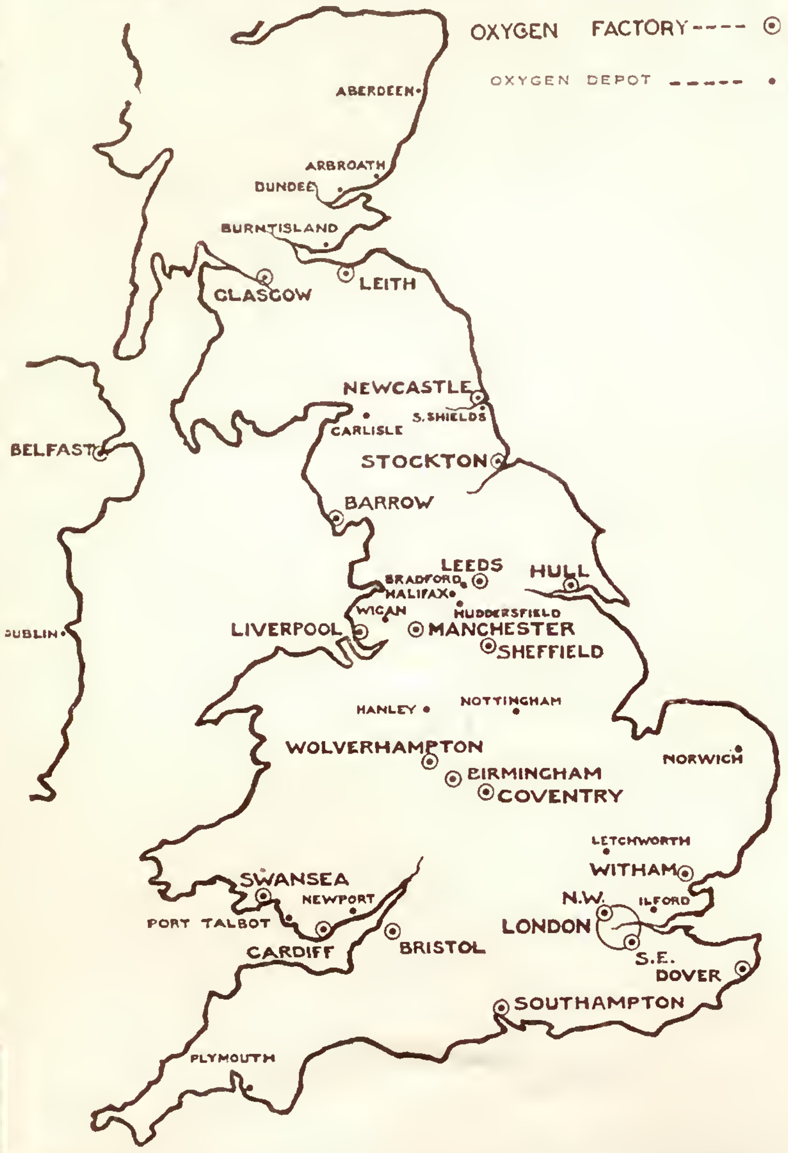

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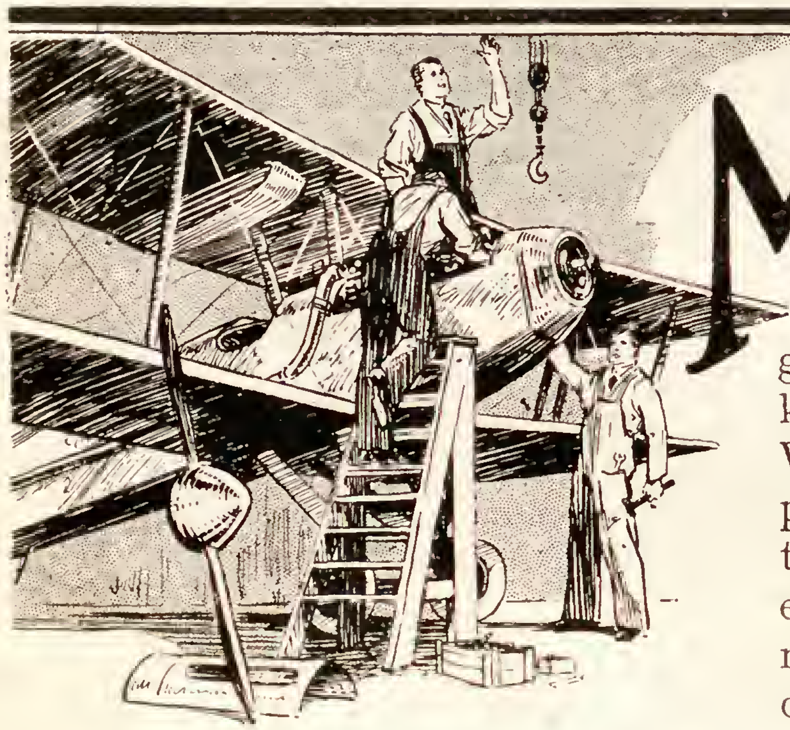

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"BRITISH AVIATION"

Royal Aero Club Monthly House Dinner

The winter season at the Royal Aero Club opened with a house dinner on Wednesday, November 10. Brig.-General the Right Hon. Lord Thomson, C.B.E., D.S.O., was in the chair. The subject for discussion, after "The King" had been drunk, was the comprehensive one of "British Aviation." Lord Thomson called upon Mr. Handley Page to open the discussion.

Mr. Handley Page, who was in his wittiest mood, commenced by welcoming the chairman to the first monthly dinner which he has attended. He said that he proposed to treat the subject from the point of view of British air policy, although two gentlemen on his right (who represented insurance interests) might not take kindly to the word "policy." He alluded to the work of the Imperial Conference, and said that lately we had heard a lot about "forging chains of steel across the Empire," etc., which he thought many members would describe as "bunkum." He wished to compare air power with sea power. Our raw materials, etc., came to us across the sea in ships, and therefore we had built up the navy to defend our mercantile marine. As a result of this dual effort, we had established a shipbuilding industry which was a pattern for the world. Our mercantile marine was self-supporting. Now civil aviation was not self-supporting: it needed subsidies from the Government. We had no aerodromes across the Empire which could be compared to such marine ports as Malta, Colombo, Singapore, Hong Kong, etc. If we had such a chain of aerodromes we could then do something with civil aviation. We must have an air policy of the Empire.

In the past, all wars were a matter of man-power. Now man was a directive agency for machines. We must aim at building up an aircraft industry which other nations would be obliged to copy and use, as they copied and used our shipbuilding industry. They must be induced to buy their aircraft from us and have their pilots trained by us. Then they would, of necessity, become our allies. They could not contemplate hostilities against the source of their supplies. He instanced the policies of France and Germany. France had a dual air policy, co-ordinating her civil and her military air policies. She spent money on extending her civil air lines to Africa and elsewhere, and made other nations look to her for the supply of aircraft. At the same time, she had various nations, such as Poland, entirely dependent on her for military aircraft. This co-ordination of efforts had proved very beneficial. Germany had been prohibited from making a military air effort; so she had concentrated on civil aircraft, and she, using only the one form of effort, was endeavouring to rival France. We British ought to co-relate our military and civil aviation air aims. The Air Ministry could help by re-equipping their squadrons with the latest types of aircraft, and selling the partly-used machines to other nations which could not afford to buy the latest types. In that way they could obtain the constant turnover which was so necessary to the trade. He looked to see the pilots of the buyer nations sent to this country to be trained free of charge.

They must engage in battle with the Treasury, which was the enemy of all progress. But we had a national need for economy, and our income-tax was very high. Therefore we must not be extravagant. We were spending £120,000,000 on defence, of which only £15,000,000 went to the air. That was wrong, and we ought to find more for the air by cutting down the votes for the other fighting services. We must spend more money on research. He did not mean on abstract matters such as $\sqrt{x}$ or $\sqrt{y}$ but on, say, experiments in mass production for war. How could we do that except by producing? We should order 50 machines in one year, instead of one, and so concentrate into one year the progress which now took 50 years. Our air progress resembled a car on a steep hill with no brakes. It must go forward, or it would slide back. He did not believe we should have any sudden revolution brought about by autogyros, or even by slotted wings (laughter). Progress must be steady and continuous. We must wake the country up. "British aviation is not dead, but sleepeth."

He strongly approved of the light aeroplane clubs, and praised Commander Perrin's work for the London club. He had heard that the Air Ministry proposed to stop the subsidy to these clubs. That would be criminal. The country needed also to win all air records. We must drive into the heads of the brainless people at the top of the tree what the brainier people lower down saw to be necessary.

Mr. Handley Page concluded by saying, "Seek ye first the right air policy, and all the rest shall be added unto you."

Sir Sefton Brancker said that he had made so many notes (on the table cloth) that now he could not read them. But he reminded everyone that our mercantile marine had been built up on a system of subsidies. Henry VIII and Elizabeth had subsidised their shipping because they considered it a good investment to do so. As regards the light aeroplane clubs, he said he would let members into a secret, and gave an explanation which seemd to satisfy Mr. Handley Page. In the past years we had adopted a penny-wise policy, and now it would cost us a lot to compete with French and German civil aviation. As for co-ordination of civil and military effort, we had, as a matter of fact, done something in that direction. He instanced various civil aeroplanes which had been developed out of experimental service types and *vice versa*. He agreed that we ought to be a supply nation, as we were in marine matters. The Japanese had learned naval matters from us and had defeated the Russians as a result. We must be ready for the day when the whole world would want air transport and must be able to expand so as to be able to supply all nations. The supply country would automatically produce its own reserves.

Mr. John Lord said that he believed the Air Ministry scheme for raising reserve and auxiliary air forces was a failure. The only thing to do was to make it possible for the ordinary man to fly; but aeroplanes still cost too much. If the Air Ministry could offer £50,000 for a helicopter, they ought to be able to devote that amount to an order for 100 aeroplanes, provided they were sold at £500 each. If the offer were made, he believed that the machines could be produced at that price.

Mr. C. G. Grey said that the aircraft industry asked for subsidies instead of producing cheap stuff. What was needed was an engine costing £150. He instanced the Morris-Cowley car, and prophesied that one day a Morris would arise in the aircraft business and make a great success.

Mr. G. C. Colebrook said that he thought the only useful remark made so far was the suggestion of Mr. Lord. If the 100 aeroplanes were produced at £500 each, he did not think that the Air Ministry would have to buy many of them. We must give up all hopes of supplying the world with aircraft, because they were comparatively cheap to produce, and only the poorest nations would consent to buy from abroad. He thought that the necessity of maintaining a navy to guard the ocean routes had been overlooked in the discussion.

Capt. F. L. Barnard said that we ought to concentrate on the civil side of flying because it was cheaper. Each aeroplane which flew to the Continent carried 20 potential advertisements. But we must make flying safe by developing directional wireless and leader cables. Then we could fly to schedule on 365 days in the year, instead of only about 300. As for safety, he strongly approved of multi-engined machines. He thought the Armstrong-Whitworth "Argosy" far ahead of any foreign machine; adding that he had not yet flown the "Hercules." He remarked that passengers were impressed by the size of large aeroplanes and believed them to be safe. He also spoke of the "inherent prestige" of British machines, which were universally thought to be the safest. (Sir Sefton Brancker: "Government restrictions!")

Major Mayo compared British aviation to a child being brought up by elderly parents. Civil flying was only seven years' old. It flew before it could walk, and it talked before it could fly. It was still a noisy child, but its growth was stunted. Its parents would not spend enough money on its education. They had devoted a million pounds to this object, and could not see that this sum was only enough to provide a course of religious instruction. The subsidy to the light aeroplane clubs was contemptible in amount, but had been very valuable in producing good work. To reduce it would be a calamity.

Mr. H. G. Simmonds spoke from the insurance point of view. What they wanted was safety. He had made his first flight at Croydon the other day, and it had left him with no impressions at all. That was good; that was how it should be with flying. Aircraft insurance had not been all beer and skittles for the companies, but he thought they were now beginning to see daylight. At any rate, they were strong believers in commercial flying, and the movement had their sympathy.

Mr. M. H. Volk urged that the light aeroplane movement should be developed.

Wing-Commander Hubbard was called upon by the Chairman but said that, as he was an official, his tongue was tied.

Mr. Handley Page then rose to sum up the debate, and spoke in still more sprightly vein than before. The A, B, C of flying, he said, stood for Aeroplane, Brancker, and Cobham. (Laughter.) He then discussed whether the initial letter of "aviation" should be pronounced long or short. After further witticisms, which kept the audience in a roar of laughter, he pointed to the orders secured by the French aviation missions to foreign countries. We had got into a vicious circle of high prices and small orders. We must find money to break this circle by economising on the Navy and Army. He then paid a tribute to the pilots of Imperial Airways, Ltd., and said that he was glad that the leader cable would be tried out.

Col. Sir Francis McClean then proposed a vote of thanks to the Chairman, and Lord Thomson briefly responded.

SIR ALAN COBHAM AT THE ALBERT HALL

On Saturday last, November 13, Sir Alan Cobham gave two lectures, illustrated by lantern slides, at the Albert Hall, one in the afternoon and one in the evening. The lectures were not quite as well attended as they might have been, and certainly nothing like as well attended as they deserved to be, but for this doubtless the perfectly wretched weather was mainly responsible, the rain pouring down incessantly throughout the day.

Sir Alan divided the lectures into two sections, in the first of which he dealt with his famous flight from London to Australia and back, while in the second section he related some stories and incidents from various flights he has made, such as to Africa in a day, to Belgium in the D.H. 53, home from Belgrade with photographs, distribution by air of films illustrating the Derby, &c.

Sir Alan's talk—for it was a chat rather than a lecture, and was greatly appreciated by the audience—was illustrated by excellent lantern slides, and although at times Sir Alan and the lantern operator got slightly "out of step" during the afternoon lecture, the photographs told a vivid story of hardships endured and difficulties overcome. When the lecturer came to tell the story of how poor Elliott met his death, the audience listened with rapt attention, and signified its sympathy for a man whom Sir Alan described as "an ideal aero engine engineer." A small incident related by the lecturer gave an indication of the sort of man—*reliable* to the last—Mr. Elliott was. When he was being lifted out of the machine after being fatally wounded, he turned around and said: "Don't forget to turn off the oil." As ever, his main thought was for his beloved engine.

Of his own share in the Australia flight Sir Alan made very light, but he was emphatic in his praise of the de Havilland 50 seaplane, its Armstrong-Siddeley "Jaguar" engine, and its Short all-metal floats. The slides shown of the "Jaguar" were among the clearest we have ever seen.

During the second half of his lecture Sir Alan told some interesting stories of various flights he had carried out, and in one of them it seemed to us he was a little unkind to the D.H. 53 with a motor-cycle engine; the speed of this machine being, he said, much too low for practical purposes, cars on the road below leaving him "standing still."

Before the commencement of the lectures, and during the intervals, the R.A.F. Band, conducted by Flight-Lieut. Amers, played some selections in its usual excellent style.

Berlin-Rome Air Service

Details have been published, says *The Times* correspondent, of the Berlin-Rome air service, which will be jointly operated next spring by the Deutsche Luft Hansa and the Italian Aero-Lloyd. It is proposed that a machine should leave Berlin every morning at 5.30 and reach Rome at 7.30 the same evening. In winter, owing to the shortness of the days, passengers will have to travel by the night express from Berlin to Munich, and take the aeroplane on from there. At present the railway journey from Berlin to Rome takes a day and two nights, about 36 hrs. The summer journey by air will take only 14 hrs., and the combined rail and air route in winter about 22. Under the arrangement reached between the German and the Italian companies, the Berlin-Munich section of the route will be flown exclusively by the Luft Hansa and the Milan-Rome section exclusively by the Aero-Lloyd. Only the Munich-Milan section will be covered by the two companies jointly.

ARGOSY
G-EBFO
SIR CHARLES WAKEFIELD FLIGHT TO AUSTRALIA
Sir Charles Wakefield Flight to Australia
LAND Aeroplane Sir Alan J. Cobham
TO RANGOON & BACK.
BACK TO AUSTRALIA & BACK.

In the Lord Mayor's Show: Sir Alan Cobham's de Havilland 50J, with Armstrong-Siddeley "Jaguar" engine, in which he flew to Cape Town and back and to Australia and back, formed part of this year's procession.

THE ROYAL AIR FORCE

London Gazette, November 9, 1926.

General Duties Branch

Air Commodore A. E. Borton, C.B., C.M.G., D.S.O., A.F.C., is appointed Director of Personal Services, Air Ministry, vice Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C. (Nov. 1); Air Commodore J. L. Forbes, O.B.E. (Deputy Director of Armament), is appointed Director of Technical Development, Air Ministry, vice Air Commodore F. C. Halahan, C.M.G., C.B.E., D.S.O., M.V.O. (Nov. 1).

The following are granted permanent commissions in ranks stated (Nov. 1): Flight-Lieut.—F. G. A. Robinson. Flying Officer.—A. Leach, M.C.

Pilot Officer A. R. Feather is promoted to rank of Flying Officer (Oct. 14); Pilot Officer on probation H. D. Gunton is confirmed in rank (Oct. 22); Flight-Lieut. A. T. Laing is restored to full play from half-pay (Oct. 23).

The following are transferred to the Reserve:—

Class A.—Flight Lieuts.—L. C. Shoppee, D.S.C. (Nov. 10); W. Jones, H. C. Todd, W. J. Umpleby (Nov. 11).

Flying Officers.—J. H. Page (Nov. 8); H. P. Morris, G. H. Rawlinson (Nov. 13).

Class B.—Flight-Lieut.—C. H. N. Nunn (Nov. 11).

Class C.—Flight-Lieut.—E. W. Simpson (Oct. 24).

Flight-Lieut. H. C. Black is transferred to Reserve, Class A (Oct. 28) (substituted for *Gazette*, Oct. 26); Pilot Officer W. T. Jones resigns his short service commn. (Nov. 10).

Pilot Officer A. H. Frost is dismissed the service by sentence of General Court Martial (Oct. 25).

Stores Branch

P. H. Wilcox is granted a permanent commn. as a Pilot Officer on probation with effect from Oct. 30, and with seny. of Oct. 9. The following are transferred to Reserve Class B (Nov. 11). Flight Lieut.—E. P. Terry. Flying Officer.—E. J. Newman, M.B.E.

Medical Branch

Temp. Capt. E. A. Wheeler, General List (Army), Dental Surgeon, is granted a temp. commn. as a Flight-Lieut. on attachment to R.A.F. (Oct. 1). He will continue to receive emoluments from Army sources; Flight-Lieut. J. J. Boyle (Capt., Army Dental Corps), relinquishes his temp. commn. on return to Army duty (Oct. 1).

Memorandum

The permission granted to 2nd Lieut. C. Farrer to retain rank is withdrawn on his enlistment in the Army (Oct. 13).

Reserve of Air Force Officers

The following Flying Officers relinquish their commns. on completion of service:—R. G. Lawson (May 29); A. F. Warner (Sept. 12); C. F. D. Evans (Oct. 23); O. A. P. Heron, D.F.C. (Nov. 7).

Flying Officer H. J. Lucas is transferred from Class B to Class C (Nov. 9).

AUXILIARY AIR FORCE

General Duties Branch.

The following to be Pilot Officer.:—*No. 600 City of London (Bombing) Squadron.*—T. Courtis (Nov. 9).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Air Vice-Marshals: Sir E. L. Ellington, K.C.B., C.M.G., C.B.E., to H.Q., Iraq, pending taking over command; 3.11.26. T. I. Webb-Bowen, C.B., C.M.G., to H.Q., Egypt, pending taking over command; 5.11.26.

Group Captain F. W. Bowhill, C.M.G., D.S.O., to H.Q., Iraq, for Tech. Staff duties; 11.10.26.

Wing Commanders: J. H. S. Tyssen, M.C., to Station H.Q., Tangmere, to command; 23.11.26. C. C. Durston, to No. 21 Group H.Q., West Drayton, for Air Staff duties; 16.11.26.

Squadron Leaders: R. D. Oxland, to No. 503 (Bombing) Sqdn., Waddington; 5.10.26. E. B. Beauman, to R.A.F. Depot, Uxbridge; 1.11.26. J. B. Cole-Hamilton, to Air Ministry (Deputy Directorate of Manning); 1.11.26.

Flight Lieutenants: J. McBain, D.F.C., to No. 5 Flying Training Sch., Sealand; 5.11.26. G. R. Oliver, to Elect. and Wireless Sch., Flowerdown; 15.11.26. J. Bussey, to Sch. of Photography, S. Farnborough; 5.11.26. W. J. Millen, to No. 1 Flying Training Sch., Netheravon; 7.11.26

Flying Officers: F. Fazey, to No. 1 Sch. of Tech. Training (Apprentices), Halton; 9.10.26. G. J. Davies, to R.A.F. Reception Depot, West Drayton; 26.10.26. G. P. H. Carter, to No. 25 Sqdn., Hawkinge; 9.11.26. E. S. Burns, to R.A.F. Station, Donibristle; 18.11.26. E. V. H. Hudson, to R.A.F.Depot, Uxbridge, on transfer to Home Estabt.; 3.10.26. C. J. Stone, to No. 24 Sqdn., Kenley; 19.11.26. E. T. St. M. Brett, to No. 5 Armoured Car Coy., Iraq.; 15.10.26. C. G. C. Woledge, to Station Commandant, Basrah; 23.10.26. F. E. R. Dixon, M.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt.; 2.11.26.

Pilot Officer C. S. Horne, to No. 1 Sch. of Tech. Training (Apprentices), Halton; 27.10.26.

Stores Branch

Flight Lieutenants: E. H. Eldridge, to Sch. of Tech. Training (Men), Manston; 26.10.26. T. A. G. Hawley, to No. 1 Sch. of Tech. Training (Apprentices), Halton; 15.11.26. A. W. Turner, to R.A.F. Depot, Egypt; 24.10.26. T. G. Bowler, to Station H.Q., Tangmere; 23.11.26.

Flying Officers: R. M. Taylor, M.C., to No. 605 (County of Warwick) (Bombing) Sqdn., Castle Bromwich; 5.10.26. A. M. Reidy, to No. 2 Stores Depot, Altrincham; 23.10.26. F. D. D. Gaussen, to H.Q., Cranwell; 1.11.26.

Accountant Branch

Wing Commander C. P. Ogden, O.B.E., to H.Q., Coastal Area; 15.11.26.

Flight Lieutenants: C. H. Moore, to H.Q., Egypt; 25.10.26. H. W. Capener, to R.A.F. Depot, Egypt; 21.10.26.

Pilot Officer H. Crowther, to No. 12 Sqdn., Andover; 8.11.26.

Medical Branch

Flight Lieutenant (Dental) J. R. Williams, to H.Q., Cranwell, on appoinment to a Temp. Commn.; 1.11.26.

IN PARLIAMENT

Aeroplane Clubs

SIR HARRY BRITTAIN, on November 11, asked the Secretary of State for Air what steps, if any, are being taken to increase the number of pupils attending the De Havilland Aircraft Company's school; and whether anything is being done to help to add to the membership of the light aeroplane clubs?

The Under-Secretary of State for Air (Sir Philip Sassoon): As regards the first part of the question the De Havilland Company's school trains both officers of the Air Force Reserve and also private pupils, including members of light aeroplane clubs. The Air Ministry is directly concerned with the question of the number of the former class of pupils only, and has guaranteed to send a total of 375 Reserve officers to the school in the period of four years from April 1, 1925, with a minimum of 80 in any one year. As regards the second part of the question I would refer my hon. friend to the reply which I gave to the hon. member for the Don Valley on July 7.

Egypt and India (Aeroplane Service)

SIR H. BRITTAIN asked the Secretary of State for Air whether, in accordance with the agreement with Imperial Airways, Ltd., signed in November, 1925, the fortnightly aeroplane service between Egypt and India will actually be in operation by January 1, 1927?

Sir P. Sassoon: Unless some unforeseen difficulty arises the service should commence operation at the beginning of January, 1927.

Captive Balloons

MR. GEORGE HARVEY asked the Secretary of State for Air whether any official investigation has taken place into the cause of the accident by which E. T. Willows and four passengers lost their lives in a captive balloon accident; and can he state what steps he proposes to take to secure airworthiness of captive balloons, and thereby prevent as far as possible a repetition of such regrettable accidents?

Sir P. Sassoon: The answer to the first part of the question is in the affirmative. As regards the second part, the existing regulations require all aircraft, including captive balloons, to be certified as airworthy, and, in addition, special permission in writing is necessary before captive balloons are flown. I may add that the question of the procedure in connection with the certification of balloons is at present under review.

ROYAL AERONAUTICAL SOCIETY

Official Notices

Lecture.—The fourth lecture of the first half of the Sixty-second Session will be held this evening, November 18, at 6.30 p.m., at the Royal Society of Arts, 18, John Street, Adelphi, W.C. 2, when Mr. R. S. Capon, of the Aeroplane and Armament Experimental Establishment at Martlesham Heath, will read a paper on "Methods of Performance Testing and Analysis." Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C., Fellow, will take the chair.

Correction.—The subject of the lecture which Mr. P. B. Henshaw, technical Director of Kayser, Ellison and Co., Ltd., will give before the Society on Thursday, December 2, at 6.30 p.m., at the Royal Society of Arts, John Street, Adelphi, has been changed to "Valve Steels." Col. the Master of Sempill, A.F.C., Associate Fellow, will take the chair.

Visit.—A visit of members of the Society will be made on Saturday, November 20, to the Fairey Aviation Works, Hayes, Middlesex. The party will meet at the works at 10 a.m. sharp. A train leaves Paddington at 9.20 a.m., arriving at Hayes at 9.42 a.m. Members of the Society wishing to join the party are asked to send in their names as soon as possible to Mr. Scott Hall, Honorary Secretary, Students' Section, 7, Albemarle Street, London, W. 1.

Paris Aero Show.—A party of members of the Royal Aeronautical Society is being arranged to go to the Paris Aero Show on December 2. Members wishing to join should notify the secretary as soon as possible.

J. LAURENCE PRITCHARD, *Honorary Secretary.*

New Italian Under Secretary for Air

GEN. BONZANI has resigned his Under Secretaryship for Aeronautics in Italy, and has been succeeded by Gen. Italo Balbo.

Royal Air Force Scottish Re-Union Dinner

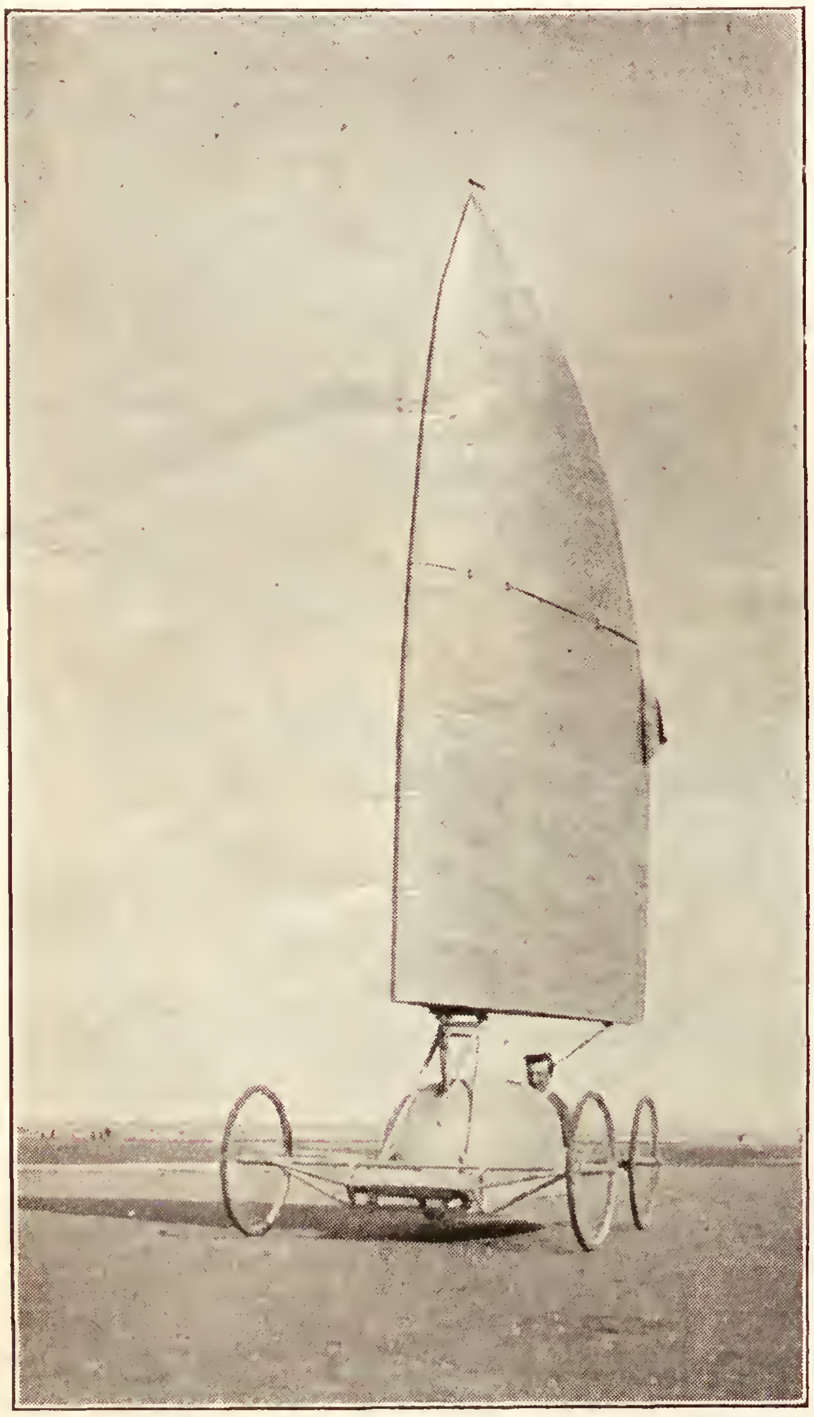
THE fourth annual dinner of the Royal Air Force Scottish Re-Union Club will be held at the North British Station Hotel, Glasgow, at 7.45 p.m. on December 17 next. Tickets for members, past and present, of the Royal Air Force and their guests can be obtained from Mr. A. Dunlop, 11, Bothwell Street, Glasgow, the price being 10*s*., which should be enclosed with the application. The past dinners have been a great success, and it is hoped to increase the number of guests still further.

Royal Air Force Flying Accidents

THE Air Ministry regrets to announce that, as the result of an accident at South Farnborough, Hampshire, to a Bristol Fighter of No. 4 Squadron, South Farnborough, on November 9, Pilot Officer Cyril Vernon Mossman, the pilot of the aircraft, and No. 364117 A. C. 2, Cecil Herbert Hayward, were killed.

As the result of an accident at Eastchurch, Kent, to a D.H. 9 A. of No. 207 Squadron, Eastchurch, on November 11, 1926, No. 315176 Sergeant (Pilot) George Frederick Taylor, the pilot of the aircraft, and No. 364039 A.C. 2, Percy Charles Hinton, were killed.

As the result of an accident at Castor, Northampton, to a D.H. 9 A. of the Royal Air Force (Cadet) College, Cranwell, on November 12, Flight Cadet David Gam Harcourt Wood, the pilot and sole occupant of the aircraft, was killed.



A famous pilot on a new mount : The Chevalier Willy Coppens, Air Attache to the Belgian Embassies in London and Paris, spent his summer holidays this year testing out a new sand yacht of his own design. It will be observed that the sail is of aerofoil (symmetrical) section, and that the mast is a pure cantilever. We understand that much better efficiency was obtained with this form of sail than with the old-fashioned type. A spare wheel was carried inside the wing. Probably the application of sails of this type to sailing boats and yachts might give interesting results.

COMPANY DOINGS

Handley Page, Ltd.

THE annual report of Handley Page, Ltd., just published is an extremely satisfactory one, for it shows that this old-established aircraft firm has emerged from a period by no means rosy into the profit-earning stage. The accounts for last year disclose a gross manufacturing profit of £82,900 and a net profit of £27,600, which exceeds the loss registered for 1924. This happy state of affairs, as explained at the ordinary general meeting held on October 21, has been brought about mainly owing to the fact that during the period under review the contracts for military and civil machines for this country and abroad had been chiefly for one type of machine, and thus enabling the cost of production to be reduced, with a consequent better financial result. They had also received royalties amounting to £5,652, as against £448.

General expenditure stood at £40,505, a decrease of £3,056, notwithstanding the greatly increased turnover. The final result was a profit of £38,981, against a loss in the previous year of £22,009, which had been transferred to the balance-sheet, reducing the debit balance to £517,202.

In his speech at the annual meeting Mr. F. Handley Page said the directors had to deal with a difficult situation in regard to the orders placed by the British Air Ministry. Under existing conditions that Department of the Government could only budget year by year for its requirements, and necessarily there was no continuity of policy from one year to another. Under such changes of policy it was impossible adequately to deal with technical progress and to place the production of aircraft in this country on an economic scale, ensuring cheap production as well as technical advance. He hoped it would be possible for the Air Ministry to be able to arrange for a production programme spread over a three years' period. If this were only possible it would result not merely to the benefit of aircraft manufacturing companies such as their own, but also to the benefit of the Air Ministry, for he was quite convinced that a continuity of policy for three or four years ahead would enable firms more accurately to judge as to the future, and so lay down a programme of their own and embark their capital with some assurance of success and development.

* * *

PUBLICATION RECEIVED

Aeronautical Research Committee Reports and Memoranda. No. 1017 (*M.* 37). Experiments Relating to the Electrification of Balloon Fabrics. By Guy Barr. June, 1926. Price 9*d*. net. H.M. Stationery Office, Kingsway, London, W.C.2.

* * *

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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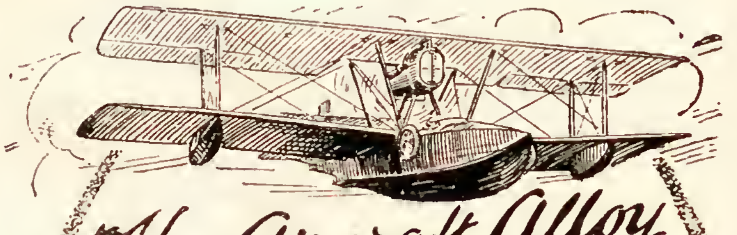

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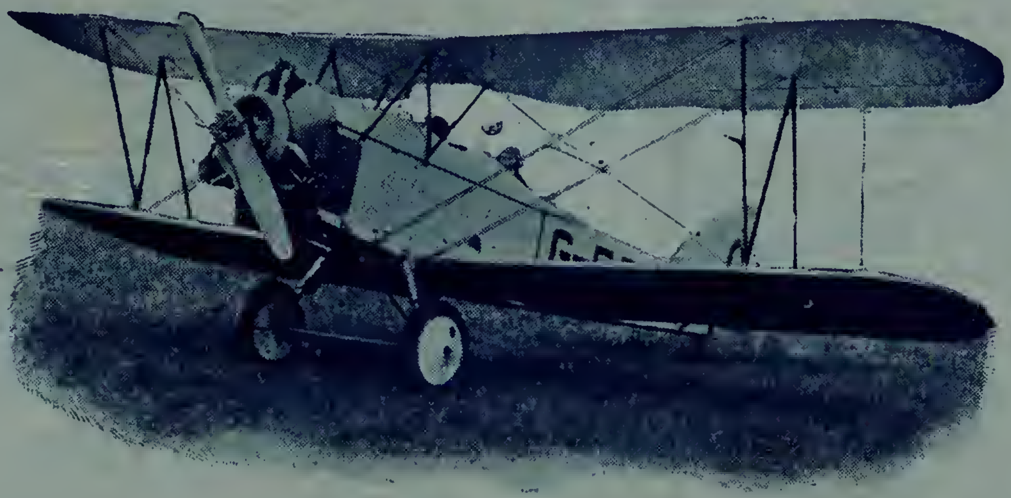

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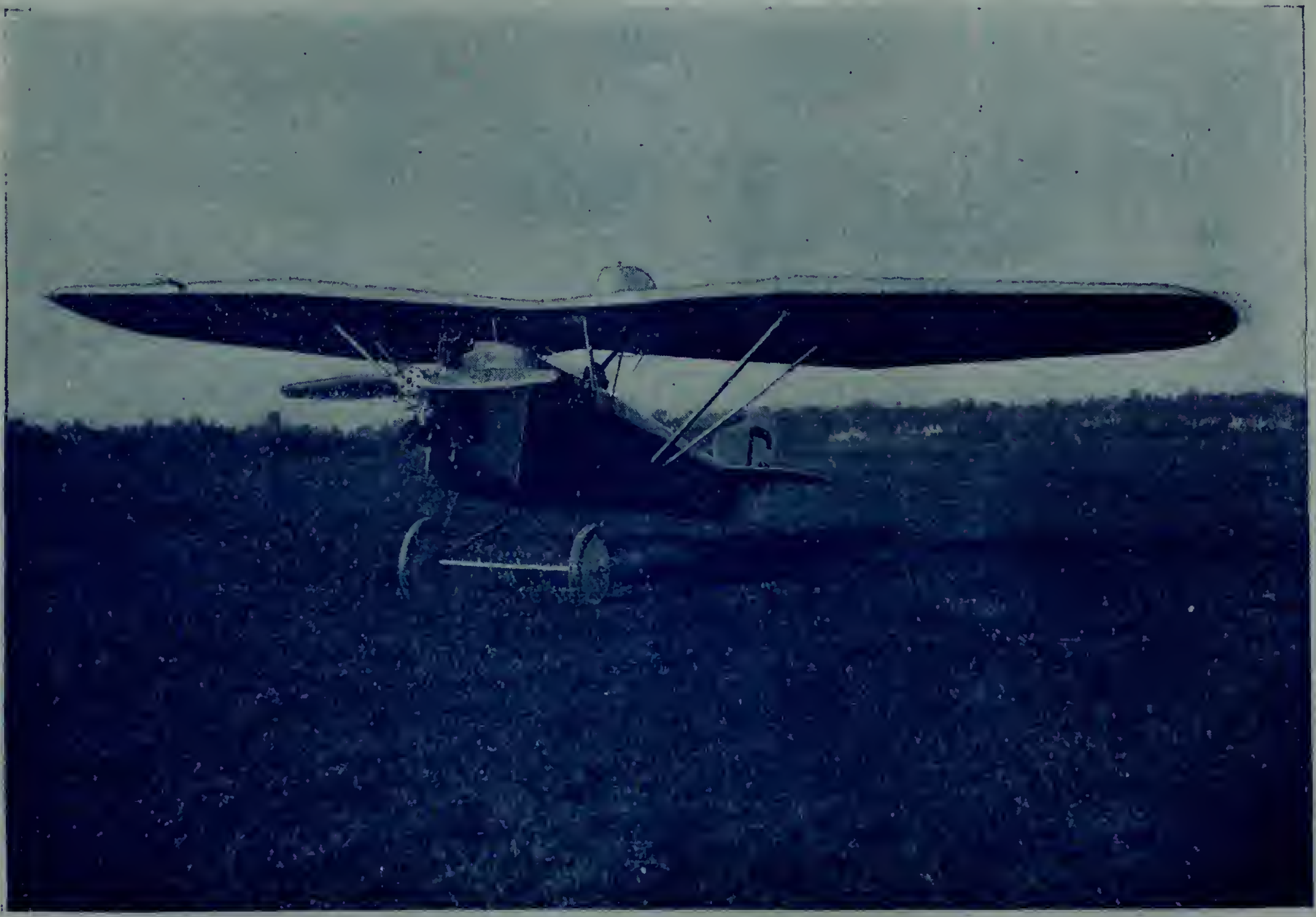

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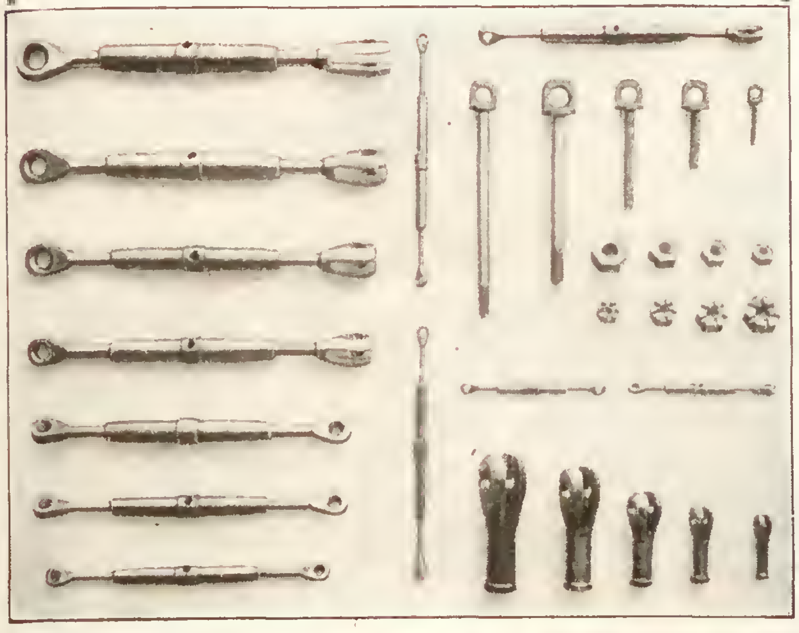

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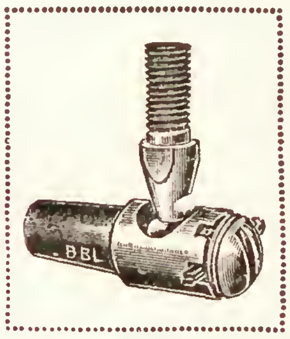

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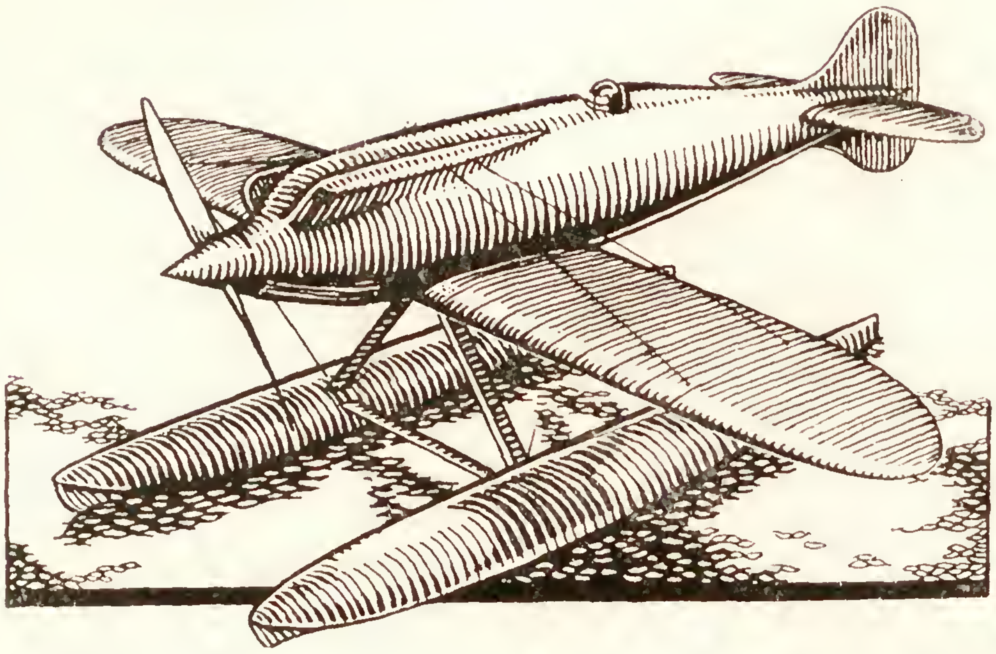

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926
Nov. 30 .... Mr. F. S. Barton, M.A., F.Inst.P. "Air Photography Apparatus," before Inst.Ae.E.
Dec. 2 .... Mr. P. B. Henshaw. "Valve Steels," before R.Ae.S.
Dec. 3-19 .... Paris Aero Show

EDITORIAL COMMENT.

The Seaplane Again

GRADUALLY the seaplane is emerging from the obscurity into which it fell during the years immediately following the war, and is winning for itself the place in the scheme of things to which it is entitled. First we have the very long flight from Rome to and around Australia, on to Tokio, and back to Rome, of the famous Italian aviator Marchese de Pinedo. Then Sir Alan Cobham's flight to Australia and back. The two magnificent flights across the South Atlantic by a Fairey seaplane and a Dornier flying-boat, both accomplished with British engines, will, of course, always rank among the outstanding trans-oceanic flights in the history of flying. And now comes the report that a French airman, Lieut. Bernard has successfully covered the distance between Marseilles and Madagascar in a Liore and Olivier flying-boat, fitted with a Gnome-Rhone "Jupiter" engine. In point of actual distance this latest flight does not, it is true, equal some of the other great seaplane flights carried out, but it is a meritorious one nevertheless, because of the fact that it covered districts where the seaplane has not hitherto penetrated, and districts situated in tropical Africa.

Leaving the Etang de Berre, near Marseilles, on October 12, two machines set out for Madagascar, the Liore and Olivier, and a C.A.M.S. The latter sustained a certain amount of damage on the Niger, and has not, so far, been able to proceed, but the LeO got through, and arrived on the coast of Madagascar on November 22, having covered a distance of approximately 8,250 miles. The flight was, no doubt, inspired by Sir Alan Cobham's flight to Australia and back, on the D.H. 50 with Armstrong-Siddeley "Jaguar," and with the object of ascertaining the possibilities of air communication by means of seaplanes in the French colonies, and, like Cobham's great adventure, it is believed to have shown definitely that the seaplane can be of the very greatest service in out of the way localities.

We understand that it is the intention of Lieut. Bernard to fly back to Marseilles by way of Lake

Tanganyika, Lake Victoria, the valley of the Nile, and along the Mediterranean. We are quite sure that wherever he comes in contact with the British Royal Air Force he will receive every assistance, and we wish him every success on his return journey

* * *

Airships The visit, on November 17, by members of the Imperial Conference to the airship station at Cardington, Bedford, has once more focussed attention on the airship programme instituted while the Labour Government was in power and Lord Thomson of Cardington was Secretary of State for Air. Visitors upon this occasion had an opportunity of inspecting the new 200-ft. mooring mast that has been erected at Cardington, and also of seeing the experimental bay of the new airship R.101 which has been constructed for test purposes. Elsewhere in this issue an account appears of the visit, from which certain interesting facts emerge. The new mooring mast appears to be a great improvement on the old experimental mast at Pulham, not only because of its much greater height, but in its mechanical details. The erection of similar masts at Ismailia and Karachi will provide bases for the experimental flights to be made when the new airships are completed, and it is to be hoped that one result of the visit to Cardington by members of the Imperial Conference will be that several of the Dominions will see the necessity of putting up similar masts, so that when the preliminary test flights have been made and the new airships are considered satisfactory, it will be possible for the ships to pay visits to some of the more distant parts of the Empire. In no branch of aviation is it more essential to "think Imperially" than in the airship branch. Airships are essentially long-distance craft, and if full advantage is to be taken of them it is absolutely imperative that the Dominions should play their part, and a very important part, in any airship scheme that is to have a chance of success.

We have on more than one occasion expressed doubts as to the feasibility of jumping from existing airships to new types of five million cub. ft. capacity, and the possibility of obtaining some detail information concerning the construction of R.101 was therefore alluring. Unfortunately, the press was not allowed to discover very much in this direction on the occasion of the visit to Cardington, the experimental bay of R.101 being treated as something rather too "secret and confidential" for the press to write about.

It is, however, possible to state, in addition to the already well-known fact that R.101 is to be mainly a steel ship, that she will be constructed of high-tensile steel, mostly in the form of tubes of special construction, and that the work in connection with the drawing of these tubes, some of which have to be made of very considerable length, is being carried out by Boulton and Paul, Ltd., of Norwich. This firm has had unequalled experience of all-steel construction, and to those who have had an opportunity of seeing some of the details of Boulton and Paul aeroplane construction, and some of the special tubes there employed, will probably have no great difficulty in making a rather shrewd guess at the particular type of tube to be used in the R.101. The very fact that the work of making the tubes has been entrusted to this firm helps to inspire confidence, and sufficient was learned at Cardington the other day to make one realise that every precaution possible is being taken to ensure that the new airship shall be adequately strong as regards her structure. Everything is being tested before being adopted, and no innovation is introduced until the most thorough tests have been made. If this policy is followed right through, there seems every chance that the new airship will be a success. She may not quite have the highest possible paying load, nor, perhaps, a very startling performance, but in our opinion that will matter little provided she is *safe*. The other desiderata can be attained later, when we have more practical experience. In the meantime it is satisfactory to find that "safety first" is the watchword of those responsible for the production of R.101.

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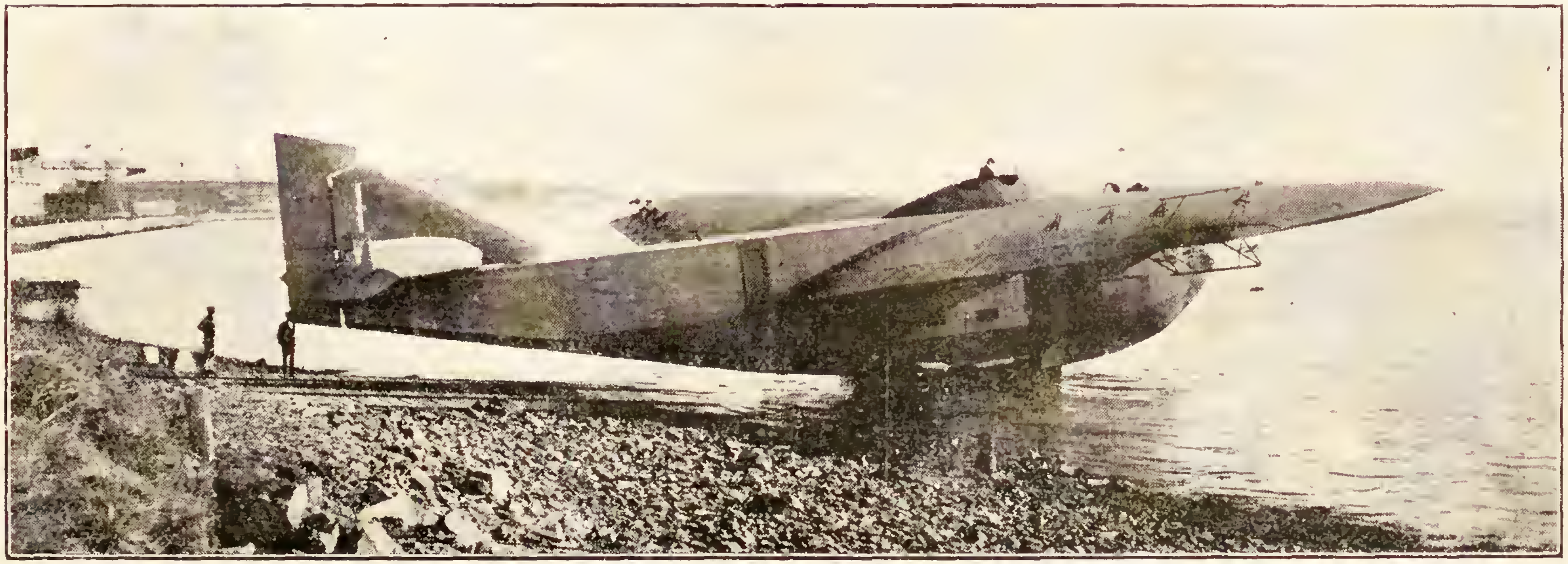


A GIANT FLYING BOAT : This French seaplane, the "Richard-Penhoët," is fitted with no less than five Gnome-Rhone "Jupiter" engines of 420 h.p. each. The machine, which has passed its flight tests successfully, has a wing span of 40 m. (131 ft.), an overall length of 27 m. (89 ft.), a maximum wing chord of 9 m. (30 ft.), and a maximum wing thickness of 1·8 m. (4 ft.). The total loaded weight is 18,000 kg. (32,600 lbs.). The machine cannot be exhibited at Paris as it will not go into the Grand Palais!

THE SUPERMARINE "SOUTHAMPTON"

Two Napier "Lion" Engines

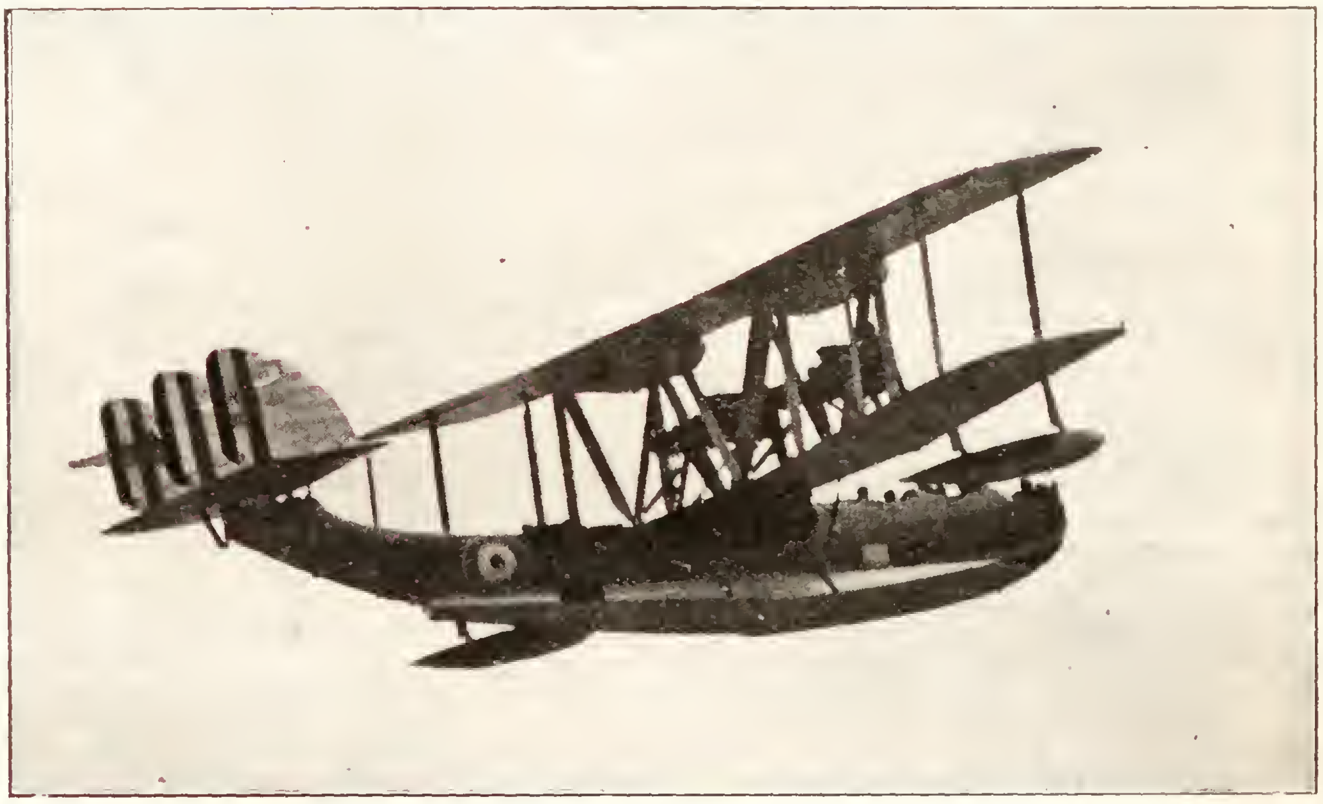
(*Continued from page 747.*)

In last week's issue of Flight we gave illustrations, general arrangement drawings, and a general description of the Supermarine "Southampton" flying-boat. In the following notes it is proposed to deal briefly with some of the most interesting constructional features of this machine.

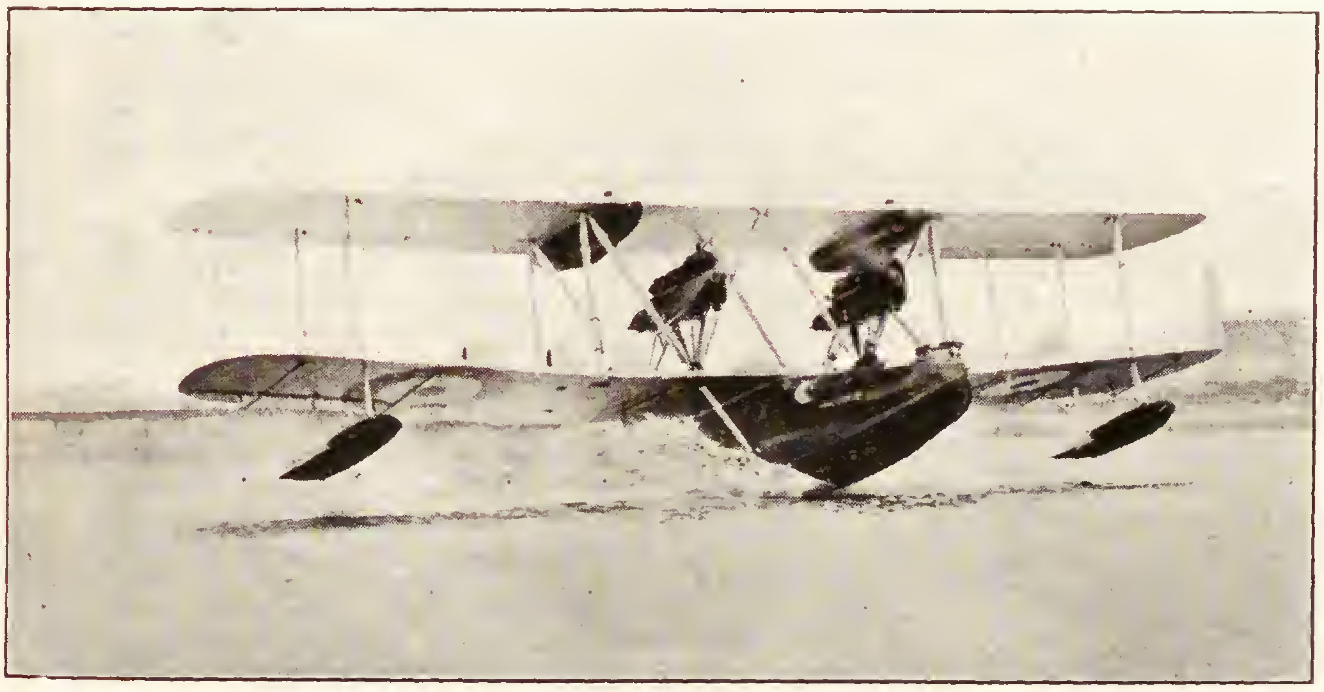
The Superstructure

The wings of the "Southampton" are of normal form as regards their biplane arrangement, but the wing bracing is somewhat unusual in that the centre section of both planes is built up in the form of a Warren girder. Apart from the advantages arising owing to the comparatively small number of struts employed, this arrangement is convenient both for the engine installation and for the clear space which it gives across the middle portion of the lower plane. Constructionally the wings follow normal practice as regards the standard type of "Southampton," but it may be pointed out that the machine is now also being produced as an all-metal flying boat, the all-metal feature extending to the wings as well as to the hull. About this, however, nothing may be stated at the moment.

Inter-plane struts of somewhat unusual construction are employed on the "Southampton." These consist, as regards the stress-carrying member, of circular section steel tubes, tapered to the ends. These tubes have attached to them light wooden formers and stringers, the skeleton thus produced being covered with doped fabric. The details of the construction are illustrated in a sketch.

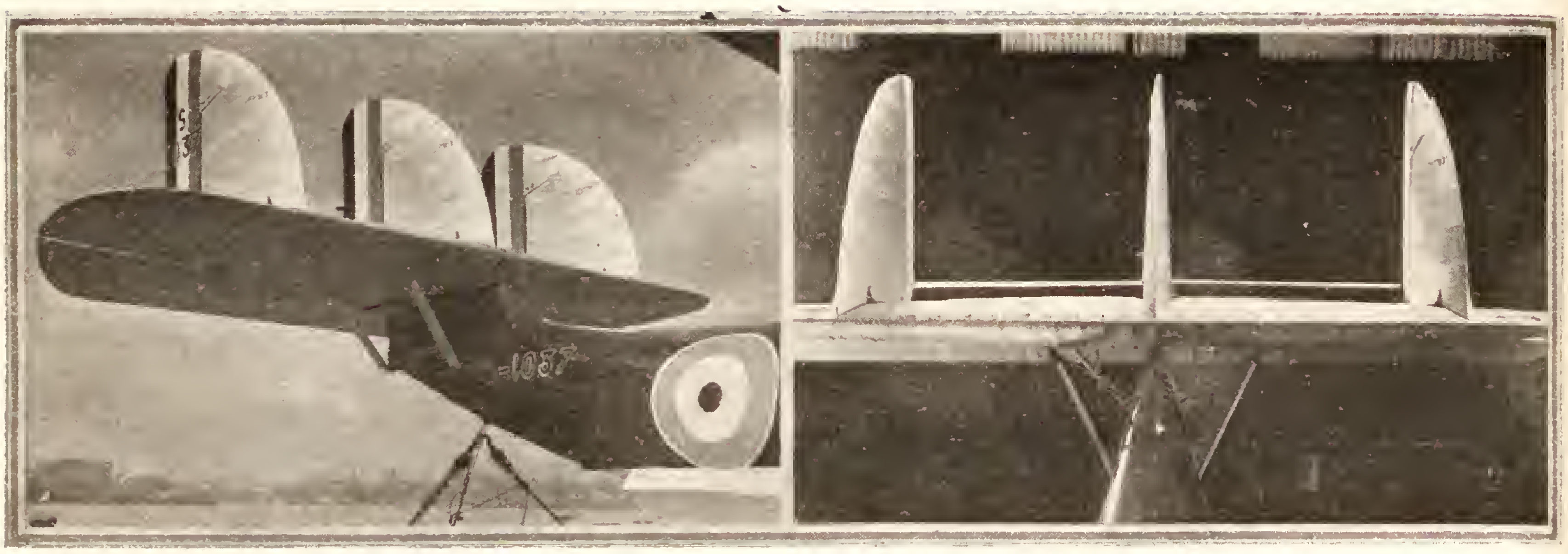


The Supermarine "Southampton" in the air: This machine is capable of flying and manœuvring with one of its Napier "Lion" engines stopped.



The Supermarine "Southampton" planing just before getting on to its steps. Note the small amount of spray.

Reference was made in last week's article to the somewhat unusual type of tail used on the "Southamptons." This consists of a monoplane tail plane, which is arranged in the form of a semi-cantilever beam, the three vertical fins and rudders being mounted on top of the tail plane, and moving with it when the tail is trimmed. The elevator is a one-piece structure and runs right across below the rudders. The tail plane is supported on the centre line of the hull, and by short struts from the hull attached to the tail plane spars a short distance out from the centre line of the machine. It will be realised that it has been no easy task to design a tail plane of this area which would be sufficiently rigid with the large overhangs which the semi-cantilever arrangement produced. The Supermarine Aviation Works have, however, evolved a special type of planked spars, which give great rigidity and have been found to provide all the stiffness required in the tail. The spars taper from the centre of the machine outwards, so that the section of the tail plane varies gradually from centre to tips. The vertical fins are pure cantilevers supported direct on the tail plane spars. Needless to say, the tail plane



THE SUPERMARINE "SOUTHAMPTON" : Two views of the cantilever tail, illustrating how little the field of fire is interfered with by the tail.

is provided with a trimming gear, so as to balance the machine in the engine-on and engine-off condition, and also, of course, to allow for any differences in trim due to variations in load.

The Power Plant

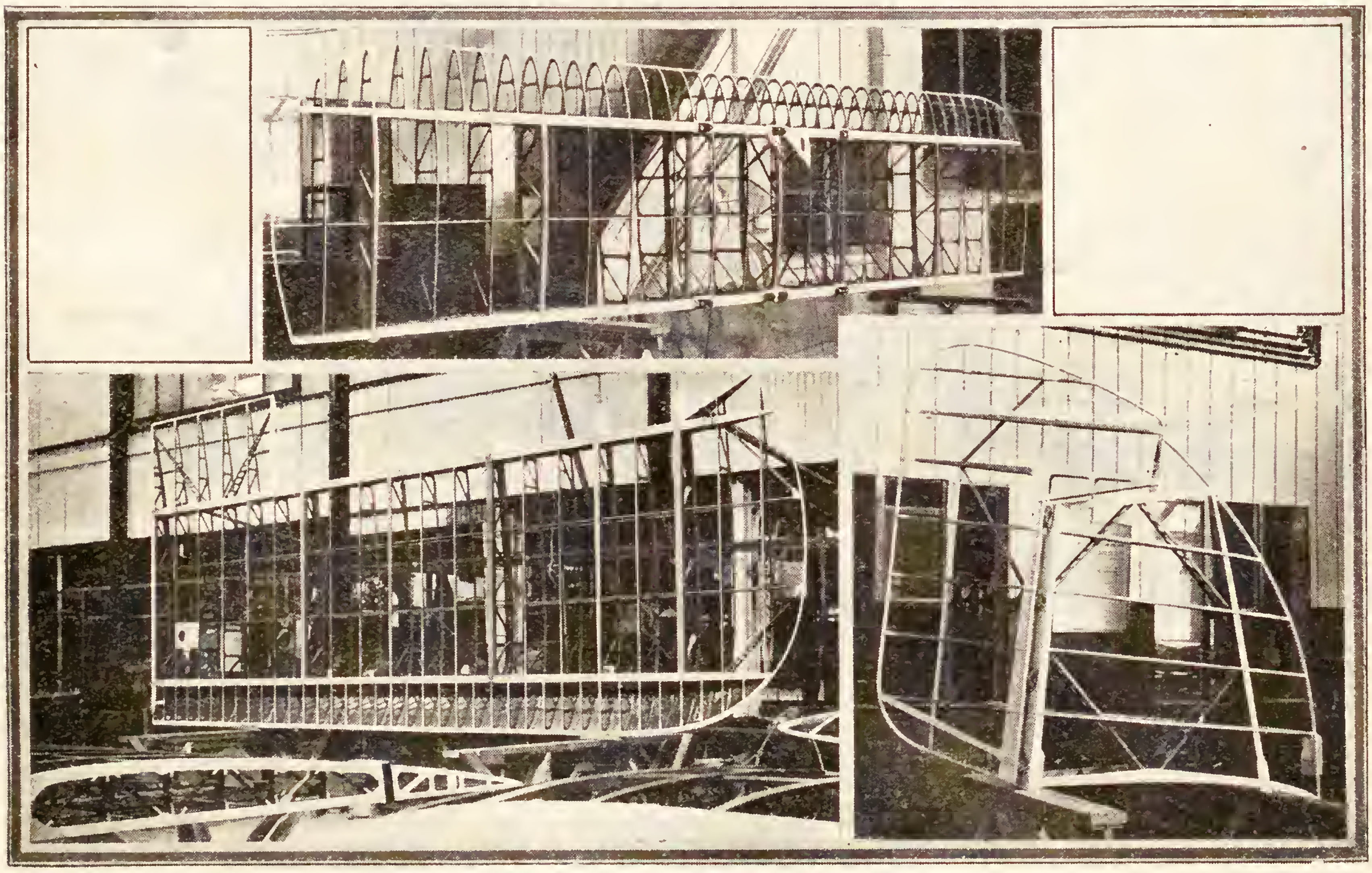
The Napier "Lion" engines are mounted on substantial bearers carried on pin-jointed tubular struts. The engine mountings are separate units mounted on the lower centre section, and can be easily removed without interfering with the wing structure by removing five pins in the strut ends, and by disconnecting the engine controls and petrol leads. Each engine has its radiator mounted in front of it, and an oil tank behind it, which are removed with the engines and mountings. As all the engine instruments are mounted on the engine bearers the complete engine unit can be lifted out of the machine with a sling from directly overhead, the position of the engines forward of the wings rendering this possible.

The petrol system is by gravity feed only, no petrol being carried inside the hull. The two main petrol tanks are slung underneath the top centre section, and are of very large capacity. One of our photographs shows the internal arrangement of baffle plates in a tank.

Hand starting gear is fitted to each engine, suitably geared to make the handles easy to turn. Standard priming pumps are fitted which feed from the filters, and the starting magnetos are geared in with the starting handles. Owing to the absence of wire bracing over the centre portion it is very easy for mechanics to climb down into the rear cockpits after starting up the engines.

The Boat Hull

The hulls of the standard "Southampton" flying-boats are of all-wood construction, although, as previously mentioned, an all-metal hull is now being produced. Both hulls are of the circular section flexible type. The standard hull embodies all the latest developments in Supermarine wooden hull design, including raised and flared bow, double bottom with air space from bow to rear step, brass running strakes and transom protecting strips. The double bottom is divided into ten



THE SUPERMARINE "SOUTHAMPTON" : Photographs of a tail plane, main 'plane, and rudder in skeleton.

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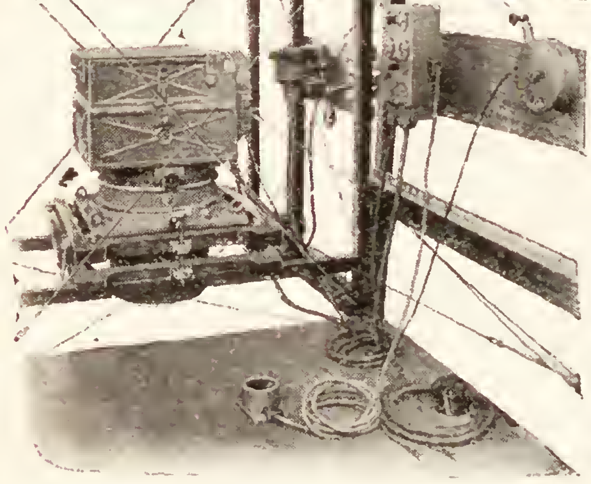

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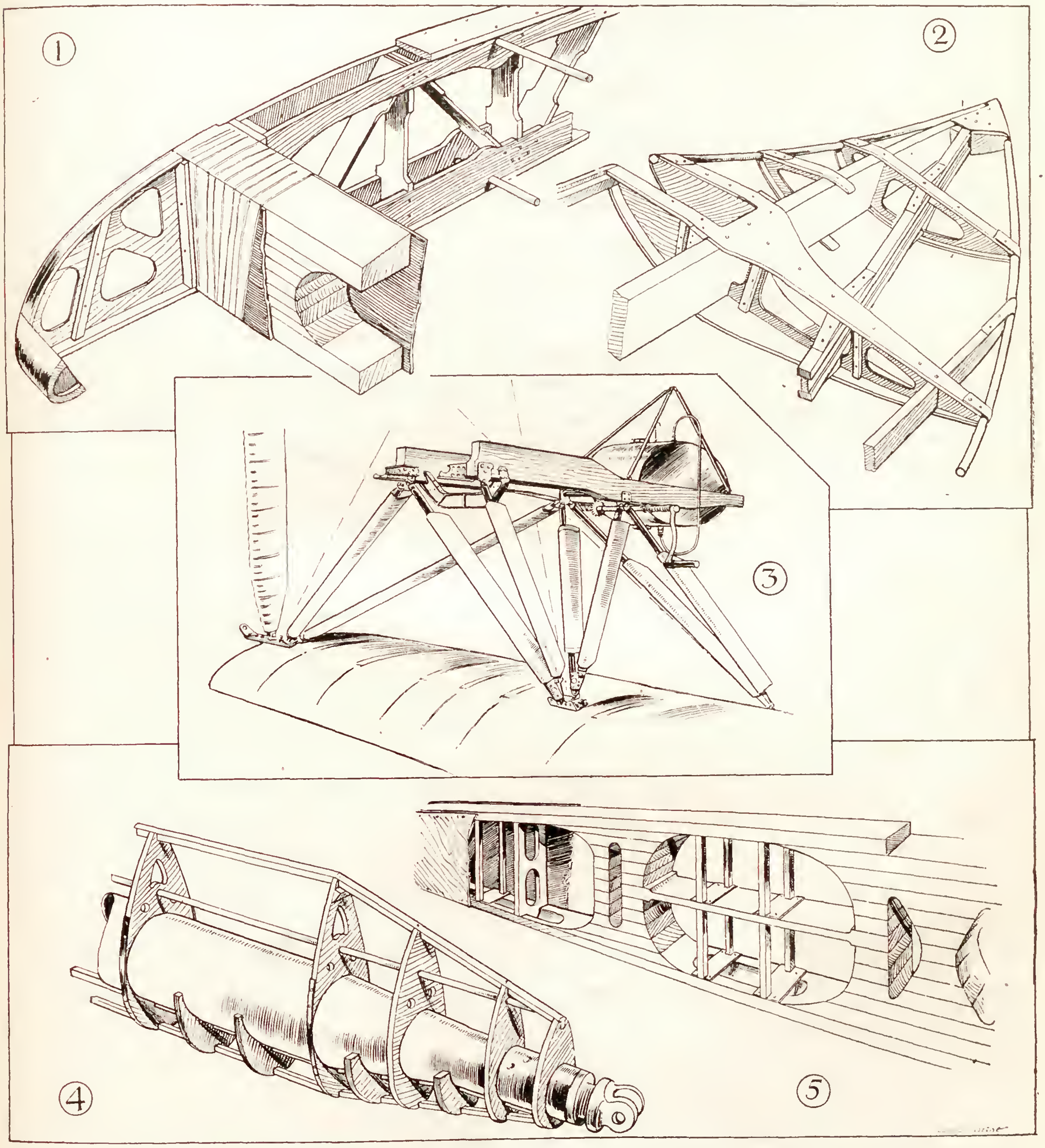
watertight compartments, each fitted with draining plugs and vents. The two steps are built in such a way that they can be easily repaired, or completely replaced in case of extensive damage. The main hull is double planked with an inner skin of cedar and an outer skin of mahogany, a layer of fabric being varnished on in between the skins.

are of American elm and mahogany. The springers are of grade A spruce. The entire construction of the hull utilises the through-fastening principle, and all fixings are of copper and brass. As mentioned last week, the circular type of construction gives a hull entirely free of obstruction inside from bow to stern.



THE SUPERMARINE "SOUTHAMPTON": Some constructional details. 1 shows details of the bottom centre-section wing, the rib illustrated being the outer rib on the starboard side. The circular section stringers are of wood. In 2 is shown the construction of an aileron, while 3 illustrates the mounting of the starboard engine. The engine-bearer structure is independent of the wing structure. The interplane struts of the "Southampton" are of somewhat unusual construction, being steel tubes with wood skeleton fairings and fabric covering. Details are shown in 4. A tail-plane spar is illustrated in 5.

The planing bottom is double planked with a diagonal skin of cedar and a fore and aft skin of mahogany, with a layer of fabric in between ironed on with marine glue. It is treated outside with a special black varnish preparation which acts as a very efficient anti-fouling agent, and gives a surface of very small frictional resistance. All timbers, hoops and saddles are of best quality American elm, while the keel and keelson

The wing tip floats of the Supermarine "Southampton" are of somewhat unusual design, and are chiefly remarkable on account of their very pronounced V-bottom. The floats are of large buoyancy, and are designed to use their full buoyancy with a very small lateral angular movement of the machine. This feature is obtained by making the floats long and shallow, and of comparatively small maximum cross-section. Both

Fuelling a Supermarine "Southampton" in front of the works.

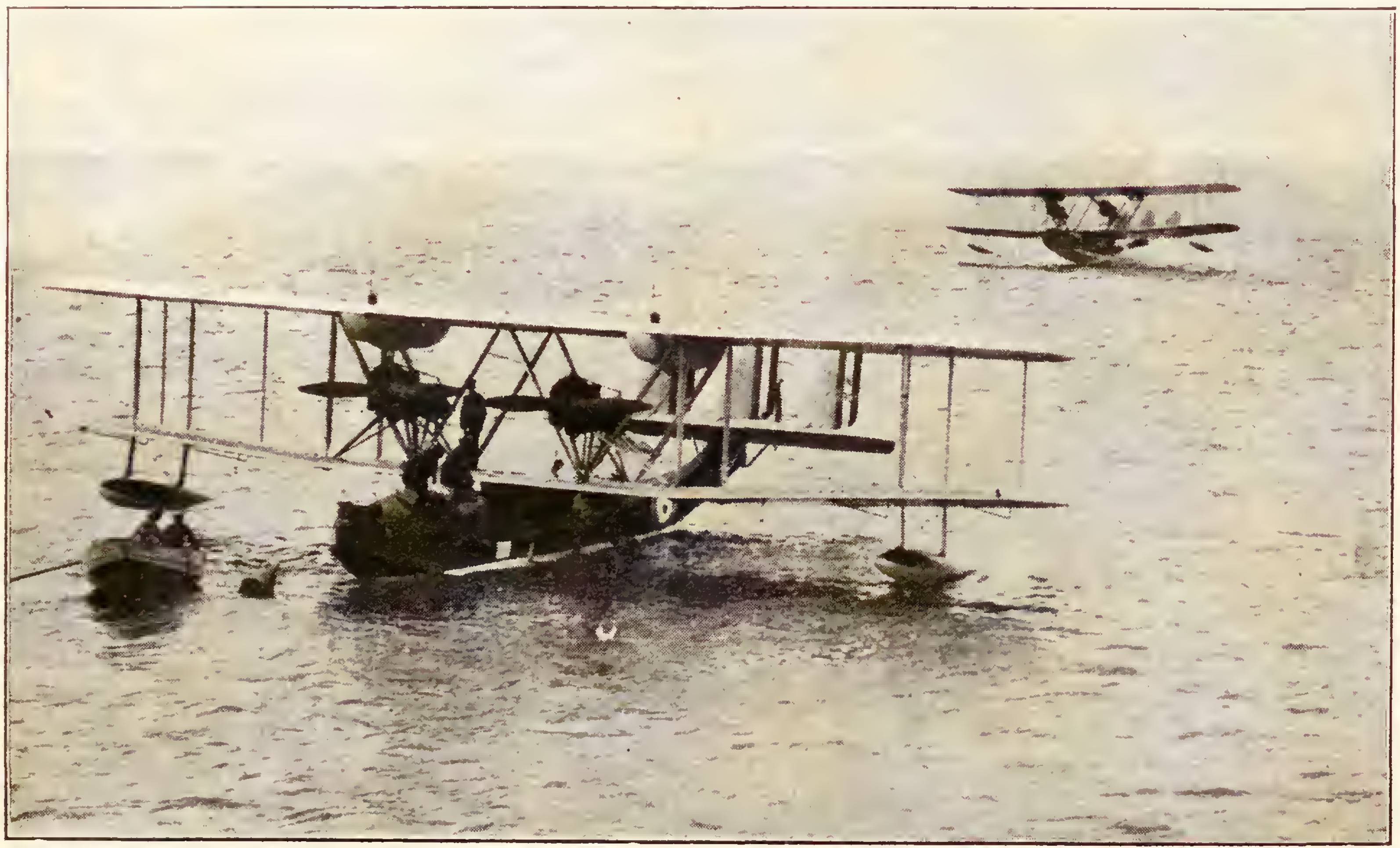
from an aerodynamic and hydrodynamic standpoint the floats are of very low drag, which, apart from the beneficial effect on performance, also prevents the machine from being yawed by the floats while taking-off or landing. Each float is divided into eight watertight compartments fitted with drain plugs.

Controls

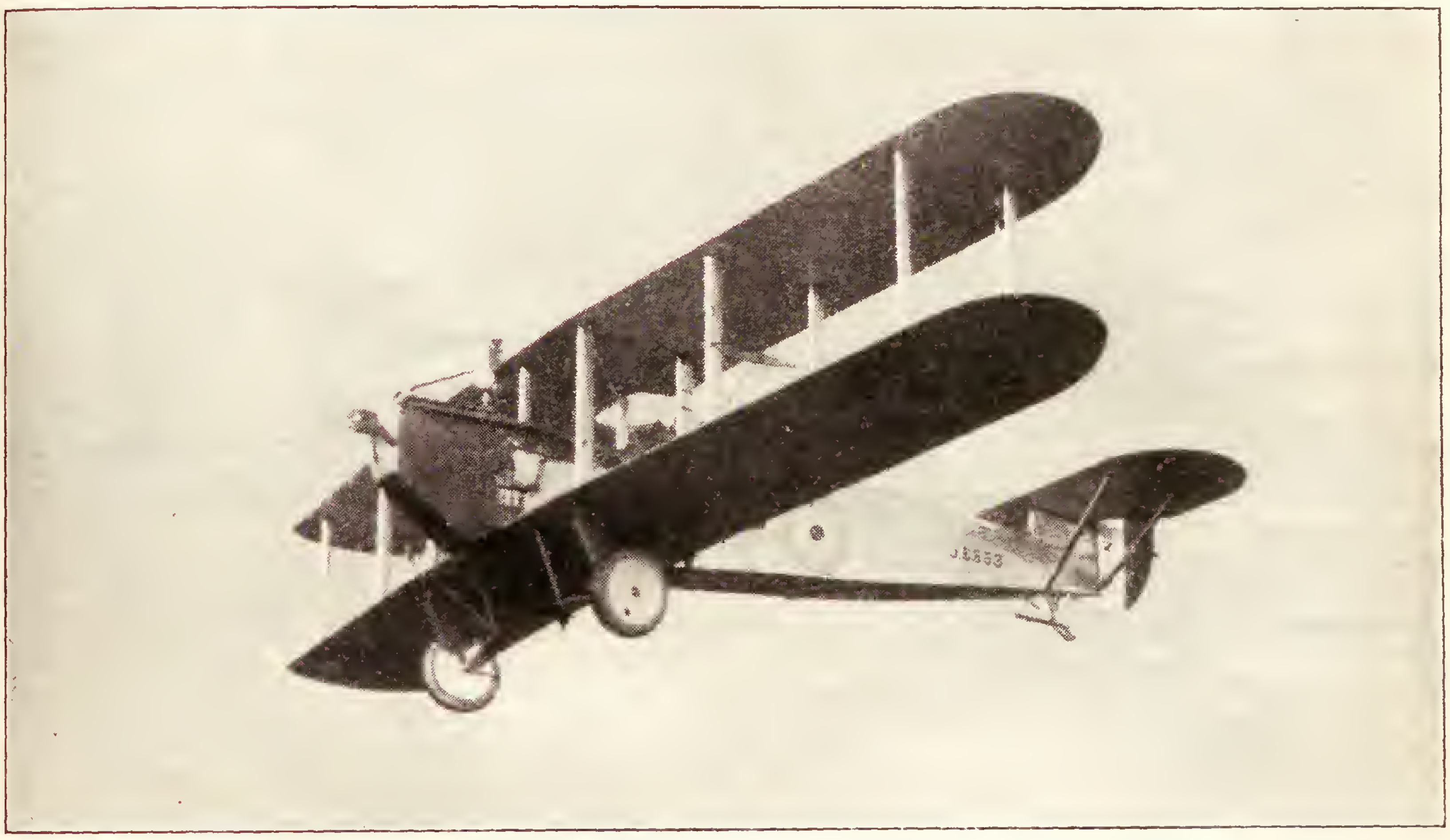
The dual controls of the "Southampton" are arranged in the form of a complete unit, a photograph of such a control unit being published this week. The complete control unit is mounted on a separate braced base, carried on tubular steel members from points of attachment in the hull. This base carries the control columns, adjustable rudder bars and seats, and the arrangement is such as to make the whole control unit very accessible. The unit can be taken from the hull and replaced very easily. The two control columns are connected below their fulcrum by a tubular shaft, and a second shaft runs from the rear column to a cross lever at the rear end of the control frame.

The elevator is operated by forward and backward movements of the shafts, which carry large "bloater" levers on the port side of the control frame. From this there is a clear cable run along the inside of the hull to a lever on a torque shaft running across the hull a few feet from the stern. The rudders are operated by a similar torque shaft in the stern of the hull, and again there is a clear run for the cables up to the control frame. The rudder bars have pedals, so arranged as to make adjustment easy to suit the comfort of pilots of varying heights.

The ailerons are operated through the torque shaft on the



Two Supermarine "Southamptons" off Cromer: The machine in the background is alighting, while that in the foreground is already moored.



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Sir Alan Cobham, in a message to "Flight."

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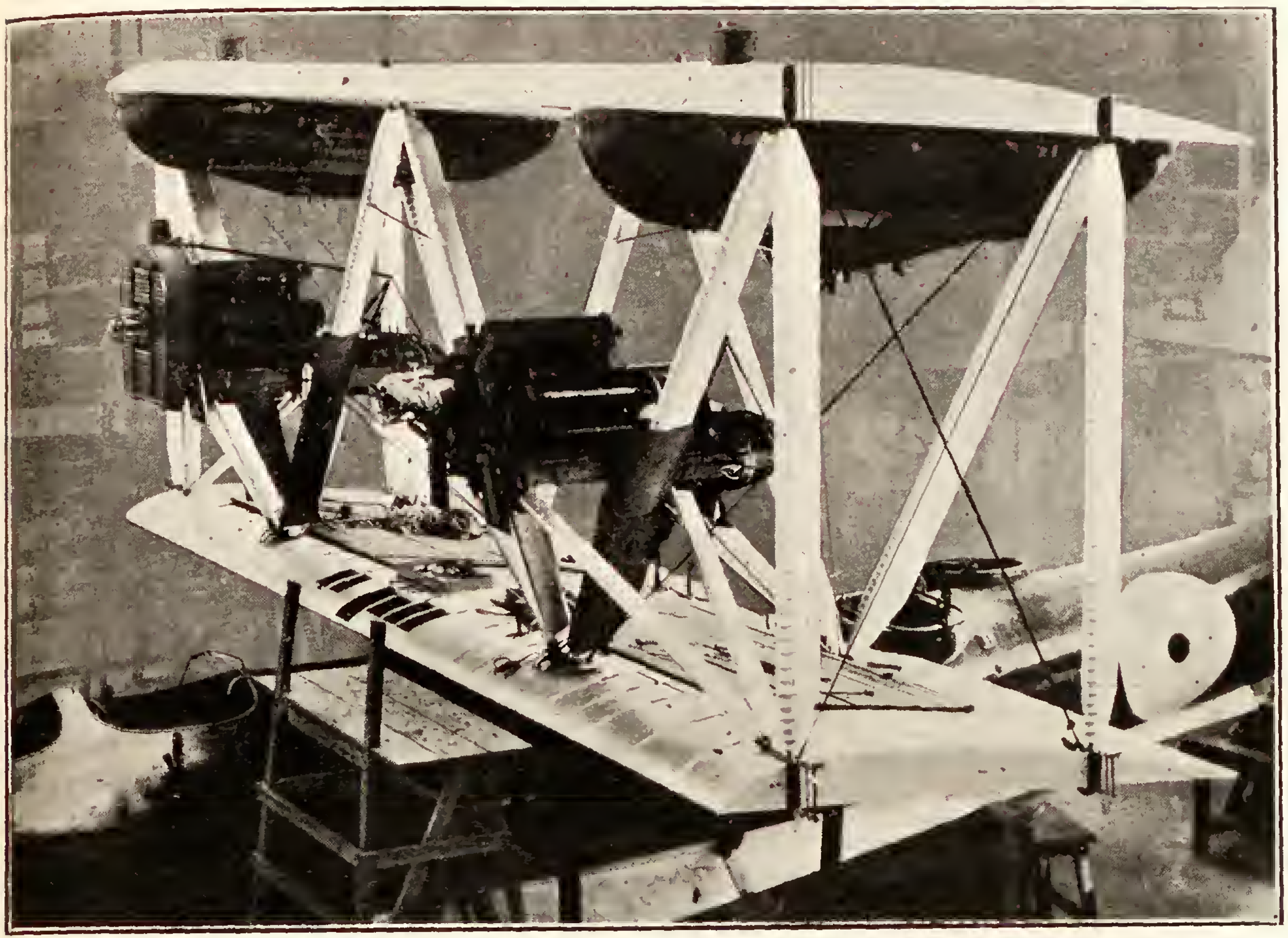


The centre section of a Supermarine "Southampton," showing the mounting of the two Napier "Lion" engines.

under-side of the control frame. The rear shaft carries operating levers on its aft end, from which aileron control cables run out to the wings. In this way control pulleys and leads are reduced to a minimum.

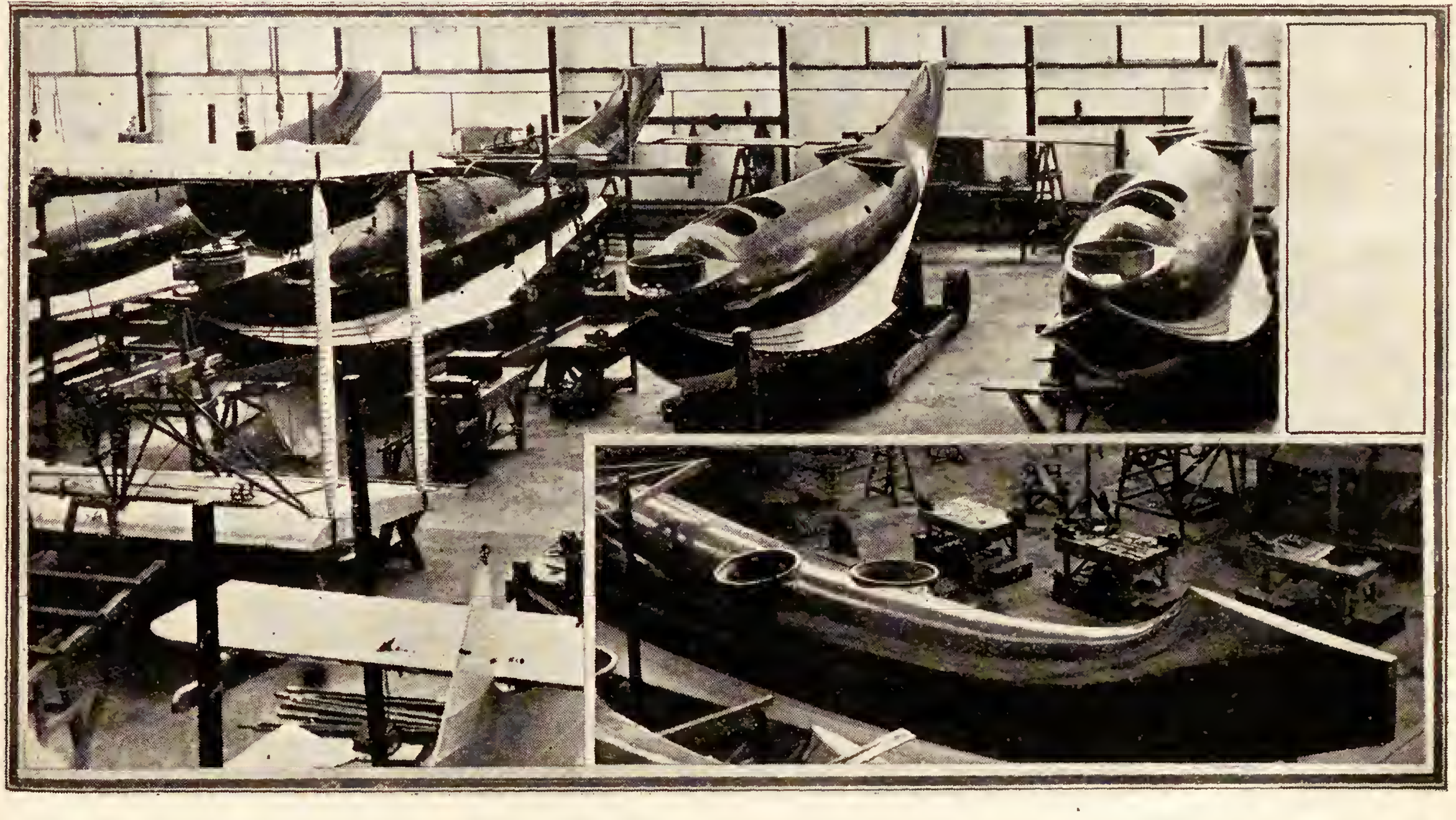
The engine controls are mounted on the port side of the pilots' cockpits, and are so arranged that the engines can be controlled either together or independently. Push and pull rods and bell crank levers are used to take the controls into the lower centre section planes, in the leading edge of which torque rods run to points immediately in front of the engines, whence there is a straight run up to the engine levers themselves.

The cockpits are roomy and comfortable, and allow complete freedom of action, and the occupants are adequately protected from winds and spray. Hinged map boards and cases and writing pads with pencil clips, etc., are provided for both pilot and navigator.

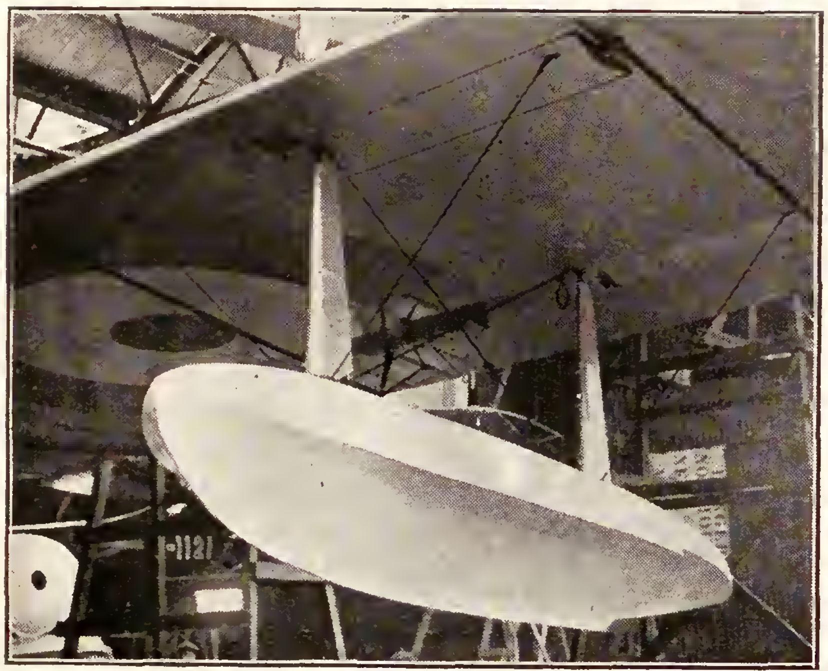
Adequate provision is made for rapid and easy movement of the crew between all cockpits and cabins. An unobstructed passage is provided, running from the forward gun ring right through to the stern of the hull. Any member of the crew can leave his seat and walk to any other member of the crew without disturbing in the least degree those he has to pass. In the pilot's and navigator's cockpits there is room for another member of the crew to stand alongside and converse.

The Beaching Chassis

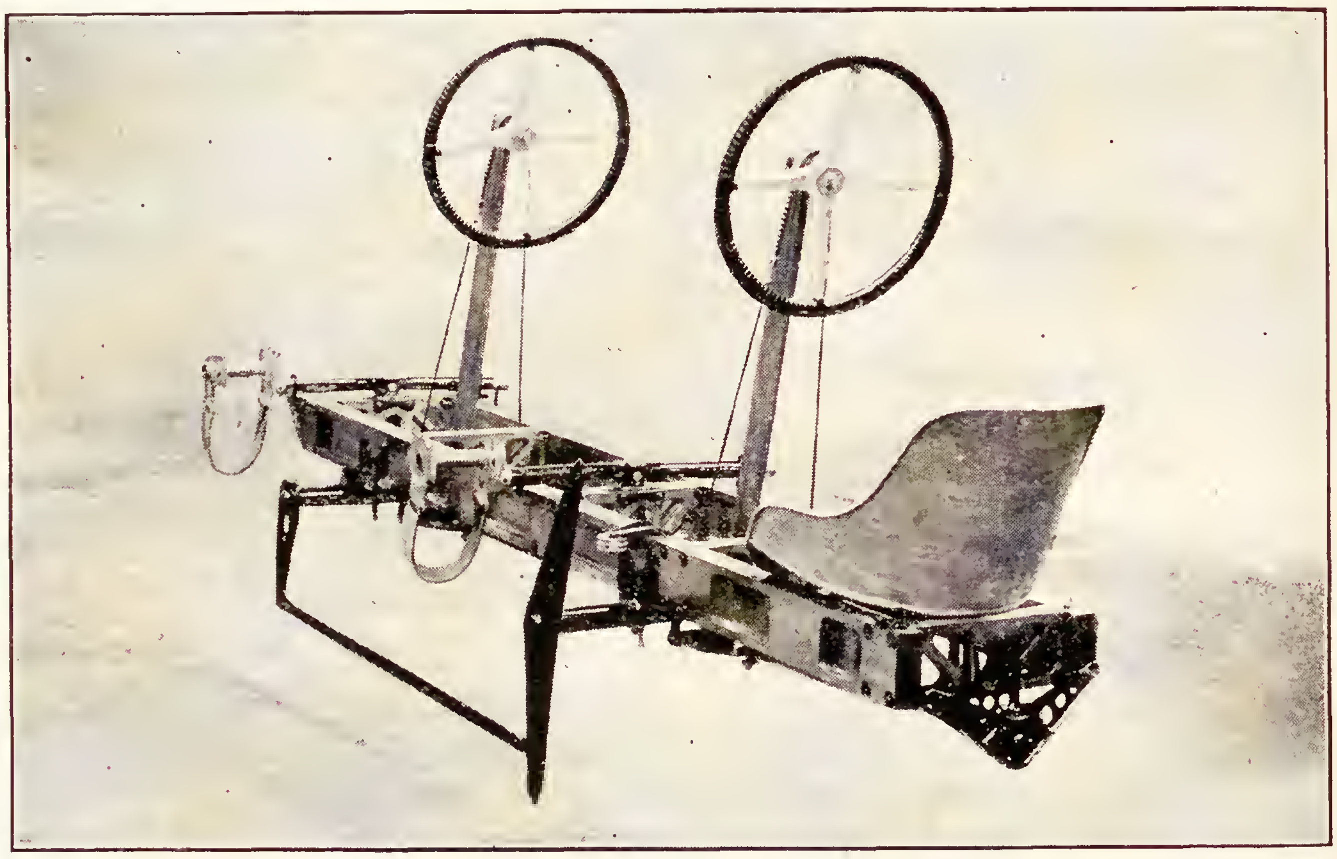
The old-fashioned launching cradle has been superseded in the "Southampton" by a new type of easily detachable launching chassis, which enables the machine to be manhandled with ease. Each side of the chassis forms one unit, and is attached on the three-point principle, and can be removed by the withdrawal of three pins on each side of the machine. The chassis can also be fitted to the machine when in the water before drawing up the slipway. A fairly detailed description and illustrations of this type of beaching



HULLS FOR THE SUPERMARINE "SOUTHAMPTON": Note the staggered cockpits for the rear gunners.

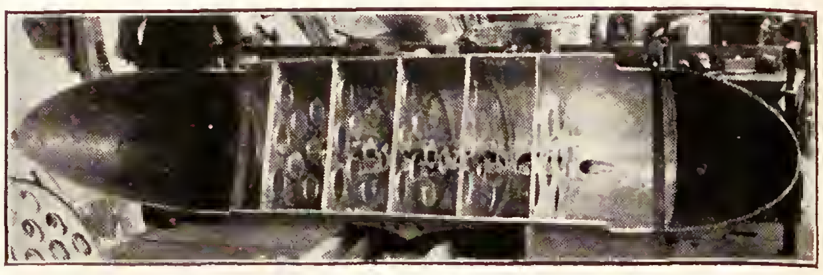


One of the wing-tip floats of a "Southampton." Note the pronounced Vee bottom.



The controls on the Supermarine "Southampton" are built up in the form of complete units, one of which is shown in this photograph.

chassis was given in the Aircraft Engineer for March 25, 1926, so that a detailed description of it is not thought necessary here. It may be mentioned, however, that one advantage of this type of beaching chassis, apart from the ease with which the machine can be handled by its use, is that it supports the machine from the wings and does not impose any strain on the hull. A tail trolley is also provided for fitting just ahead of the rear step.



View inside a main petrol tank of the "Southampton," showing baffle plates.

The Supermarine "Southampton" can also be supplied fitted with two Bristol "Jupiter," Series VI, engines, in which case the loads carried when the machine is used for bombing and reconnaissance respectively, are 6,110 lbs., the figure in the former including 400 gallons of petrol, and in the latter 500 gallons of petrol. The figures for weight, empty, load carried and total loaded weight are 8,190 lbs., 6,110 lbs., and 14,300 lbs. respectively. The estimated performance is as follows :—Top speed at sea level, 109 m.p.h. (175·5 km/h.) ; rate of climb at sea level, 643 ft./min.; ceiling, 14,700 ft. (4,500 m.); minimum flying speed, 56 m.p.h. (90 km/h.) ; optimum cruising speed, 85 m.p.h. (137 km./h.) ; range at cruising speed on 500 gallons of petrol, 850 miles (1,370 km.).

◆ ◆ ◆ ◆

Westland Aircraft Society (Petters, Ltd.)

It has been decided that to enable members to put forward their views for the consideration of the Committee, a Suggestion Book should be started. This book will normally be kept by the Secretary, but any member can borrow it in order to enter therein any suggestion to further the interests of the Society.

In connection with the Course of Lectures for Prospective Ground Engineers, the following preliminary syllabus has been arranged :—

Already given.—October 27, Mr. W. G. Gibson, "Erection and Rigging" ; November 4, Mr. W. G. Gibson, "Faults on Flight Tests, Diagnosis and Correction" ; November 10, Mr. H. H. W. Vowden, "The A.I.D." ; November 17, Mr. Fletcher (of "Titanine"), "Dopes, Lacquers, &c."

November 25, Mr. T. Carey, "Aircraft Timbers" ; December 1, Mr. V. S. Grant, "Seaplane and Flying Boat Construction" ; December 8, Mr. R. C. Taylor, "Component Checking and Inspection" ; December 15, Mr. Gibson, "Defects and Deterioration" ; December 22, Mr. Sutcliffe, "Testing of Materials."

As regards the "General Interest" lectures, the second of these was given on November 19, when Mr. Adams, of Bruntons, Ltd., gave a lecture on "Cold-Worked Steels used in Aircraft." The next lecture will be given on December 3, when Squad.-Leader Gregory will speak on "Some Experiences in Iraq, with special reference to Wireless."

Flying Accident

We sincerely regret to have to place on record the first fatal accident to happen on a D.H. "Moth." The mishap, the cause of which is at present unknown, occurred on November 22, the pilot being Mr. Sydney St. Barbe, one of the London club instructors, who had with him as passenger Mr. J. F. N. Michie. Mr. Michie, who was a ground engineer at the club, was killed, but the pilot escaped with concussion and a broken ankle. He is reported to be progressing satisfactorily.

No other aero engine can show such a record of achievement during 1926 as the NAPIER LION—

For the three long-distance Service flights carried out by the Royal Air Force—from Cairo to Cape Town and back to England: from Plymouth to Alexandria and back: from Cairo to Aden and back—Napier engines were selected. A total engine mileage of 101,000 was flown without any mechanical trouble.

The only crossing of the South Atlantic by a single machine was made by Commandante Franco when he flew from Spain to Buenos Aires, covering 6,259 miles in 59½ hours.

On commercial service Imperial Airways have flown Napier engines 566,200 miles in 12 months.

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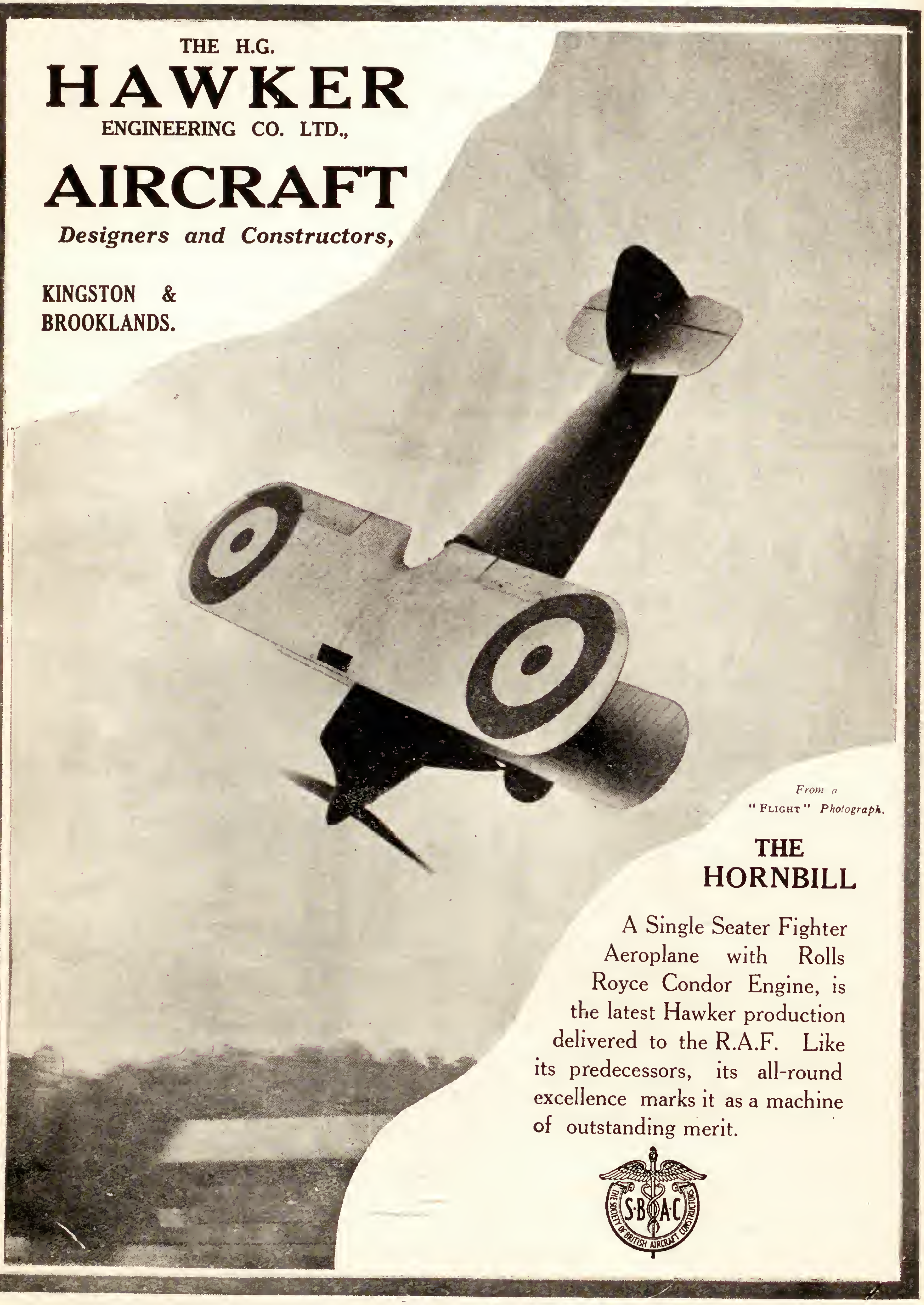

From a "FLIGHT" *Photograph.*

THE HORNBILL

A Single Seater Fighter Aeroplane with Rolls Royce Condor Engine, is the latest Hawker production delivered to the R.A.F. Like its predecessors, its all-round excellence marks it as a machine of outstanding merit.

S·B·A·C
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

The AIRCRAFT ENGINEER

FLIGHT ENGINEERING SECTION

Edited by C. M. POULSEN

November 25, 1926

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OUR CONTRIBUTORS

Prof. E. Everling, whose article, entitled "Comparative Quantities in Aircraft Statistics," appears in the present number of The Aircraft Engineer, is a well-known writer on aerodynamics in Germany, and it is with very great pleasure that we introduce him to our readers this week. We use the expression "introduce" advisedly, because it is an unfortunate fact that, although in Germany it is the rule rather than the exception for all seriously interested in aeronautics to follow closely what is written on the subject in other countries, in England we are a little apt to let the language difficulty stand in the way of our study of foreign technical literature. Thus we fear that the work of Prof. Everling, as of that of a number of other prominent German writers, may not be as widely known in this country as it deserves. We hope in the future to do our small share by publishing, as occasion affords, translations of articles by foreign writers on aeronautical subjects. Unfortunately, The Aircraft Engineer is not yet of sufficient size to allow of publishing all that deserves to be published, but we do feel that even an occasional article from a foreign writer may do a good deal towards an interchange of ideas and viewpoints.

The three quantities which Prof. Everling has put forward seem to offer a convenient means of comparing the efficiency of different machines and, although the fact that throughout the article German expressions and coefficients, as well as metric units, are used will doubtless prove slightly bewildering to some, there should be no great difficulty in following the writer's arguments. The numerical values of the three quantities are, of course, those based on Continental units, but as they are intended merely for comparative purposes, this should not greatly matter.

Mr. J. D. North continues this week his series of articles on "Aircraft Performance," and more particularly on structural policy in design, dealing mainly with the effect of changes in gap/span ratio. He arrives at the conclusion that a change of gap of 10 per cent. has made no difference to the weight of the wings, the increase in weight of struts having just balanced out the reduction in weight of the spars and wires. The article has been written under great difficulties, as Mr. North has been suffering from a touch of influenza, but he carried on and completed the article rather than disappoint our readers, a fact which they will, we feel sure, greatly appreciate.

COMPARATIVE QUANTITIES IN AIRCRAFT STATISTICS.

By Professor E. Everling.

[In the May 28, 1926, issue of the *Zeitschrift für Flugtechnik und Motorluftschiffahrt* (generally given in the slightly more convenient form "Z.F.M.") there appeared an article entitled "Vergleichsgröszen zur Flugzeugstatistik" by Professor E. Everling, which contained the derivation of three new quantities intended to facilitate comparison between various machines as regards efficiency. Hitherto a comparison between machines has been no easy matter, and it was thought that the new quantities might afford a means of rendering this possible. Consequently we approached Professor Everling and the Editor of the "Z.F.M." for permission to translate the article for the benefit of readers of The Aircraft Engineer, and this permission was willingly granted.

The task of translating the article has been no easy one, mainly because in the majority of instances no English translation existed which would adequately represent the meaning of the original German expression, and so a fair number of English expressions have had to be "coined." The Editor of The Aircraft Engineer does not claim that these translations are always the best possible, and will be glad to receive suggestions for improvement before some of the coined words definitely pass into the English language. The matter is one of considerable importance, not with regard to the present article only, but in aeronautical literature generally, and it is undesirable to introduce fresh expressions unless these are to be generally accepted and "standardised" as it were.

Professor Everling's article, as originally published in the "Z.F.M.," contains a very great number of footnotes giving references to other works by the same author and by others. As in the vast majority of cases British readers of The Aircraft Engineer will not have access to these works, all of which are contained in German publications, it has not been thought necessary to quote the majority of these footnotes. This should not, however, be taken as proof that Professor Everling has failed to give chapter and verse for his claims, and those sufficiently interested in the details of the derivation of the three new quantities "high-speed figure," "distance-figure," and "altitude-figure," are advised to refer to No. 10 of 1926 of the "Z.F.M."

As regards the use of the Everling quantities, in the future we propose to follow the example of the "Z.F.M." and give the values of these three quantities in machine descriptions wherever the necessary information is available. By adhering to the original units direct comparison with foreign machines becomes possible.—Editor.]

Statistics relating to aeroplanes already constructed should not be neglected as a suitable source of assistance in aerotechnical investigation. Usually, in aircraft descriptions, the values of wing loading, power loading, and, more recently, of the ratio of engine power to wing area,* are stated. In addition to these values, which are not directly comparable, the following come into consideration :—

(*a*) The " high-speed figure " (*Schnellflugzahl*), which is a comparative figure for the speed with reference to the " wing-power."

(*b*) The " distance-figure " (*Weitflugzahl*), which is the speed converted according to the power loading (not an optimum value, but a quantity corresponding to the angle of incidence at the measured speed).

(*c*) The " altitude-figure " (*Hochflugzahl*), which is the ceiling referred to unit " loading-figure " (*Bauzahl*), this, in turn, being the power loading multiplied by the square root of the wing loading.

These three figures correspond to the propeller efficiency divided by : (*a*) The drag coefficient ; (*b*) The gliding angle or D/L, and (*c*) The " flight-figure " (*Flugzahl*).

Aircraft statistics do not yet occupy, within the scope of theoretical aeronautical investigation, the place which they deserve. The numerous data in the descriptive articles in the technical press still require to be sifted and utilised in accordance with certain viewpoints.

In order to facilitate this for various purposes, it is intended that in the future the aircraft descriptions appearing in the " aviation review " of the Z.F.M., and the technical section of the (German) " Aviation Notices " (which correspond somewhat to our " Air Ministry Notices."—ED.) shall be supplemented in this direction. In these are given from the technical press, as well as from special reports from at home and abroad, data relating to dimensions, weights, performances and qualities which permit of either a direct comparison of individual machines, or of checking the data given for misprints or for intentional " colouring." This shortcoming is only partly remedied by always giving, provided the available data permit of doing so :—

(1) The wing loading G/F, in kg./sq. m.
(2) The power loading G/N, in kg./h.p.
(3) The " wing-power " N/F, in h.p./sq. m.

(3) is obtained by dividing (1) by (2) and is scarcely ever stated in technical literature on the subject, although it is of great importance for the purpose of speed estimates, as the following considerations will show.

These three quantities in themselves mean very little, not least because they can be given for an aeroplane which has never flown. They should rather be compared with the results of reliable flying tests, and particularly with the measured speed and ceiling. When that is done, it is possible to derive comparable values which afford a measure of the efficiency in one respect or another.

In the case where no flying test results are available, but only estimated performance figures, these same quantities provide a means of ascertaining whether or not the predictions were too optimistic. Finally, the upper theoretical limits, or optimum values, of these comparative quantities can be quantitatively given, as well as the values already attained in practice, and thus the progress of development.

To begin with, the following three quantities come into consideration :—

(*a*) the " high-speed figure " $\frac{\eta}{c_w}$

(*b*) the " distance-figure " $\frac{\eta}{\epsilon}$

(*c*) the " altitude-figure " $\frac{\eta}{\kappa}$

in which the following notation is used :—

η for the propeller efficiency,

c_w for the drag coefficient corresponding to c_a for the lift coefficient,

$\epsilon = \frac{c_w}{c_a}$ for the gliding angle, or D/L,

$\kappa = \frac{c_w}{c_a^{1\cdot5}} = \frac{\epsilon}{\sqrt{c_a}}$ for the " flight-figure," all unknown.

Concerning the notation we must go back to the well-known relations from the mechanics of flying :—

Lift (kg.) $A = c_a \frac{\gamma}{2g} v^2 F$,

in which—

$\gamma =$ the weight of air, *i.e.*, weight in kg./cu. m.

$\frac{\gamma}{g} =$ the air density (kgs. ^{2}/m.^{4})

$v =$ the velocity in metres per second, *i.e.*, $V = 3{\cdot}6v$ in km/h.

$F =$ wing area in sq. m.

For steady horizontal flight at any altitude, also at the ceiling, the following holds exactly, and for steady climbing flight approximately :—

Weight = Lift, $G = A$.

Furthermore, the propeller horse power $75\eta N$ (kgm./sec.) is divided into two parts, of which one is required for sustentation in horizontal flight, while the other is a surplus required for acceleration and particularly for climbing :—

$$75\eta\, N = Wv + Gw\,;$$

in other words, the rate of climb w (m/s) equals the available surplus of power referred to unit weight :—

$$w = 75\eta\frac{N}{G} - \frac{W}{G}v = 75\eta\frac{N}{G} - \epsilon v = 75\eta\frac{N}{G} - \kappa v_1$$

Introduced here is the " unit speed " v_1 (m/s) in abbreviated form†

$$v_1 = v\sqrt{c_a} = \sqrt{\frac{2g}{\gamma}\cdot\frac{G}{F}} = \sqrt{\frac{2g}{\gamma_o}\cdot\frac{G}{F}}\sqrt{\frac{\gamma_o}{\gamma}}$$
$$\approx 4\sqrt{\frac{G}{F}}\sqrt{\frac{\gamma_o}{\gamma}}$$

" Unit speed " is the speed corresponding to the angle of incidence at which $c_a = 1$.

For horizontal flight the " high-speed figure " is given by the thrust horse-power, together with the relation for the drag coefficient :—

" High-speed figure " $\frac{\eta}{C_w} = \frac{v^3}{75}\cdot\frac{\gamma}{2g}\cdot\frac{F}{N} = \frac{V^3}{7{,}000}\cdot\frac{\gamma}{g}\cdot\frac{F}{N}$;

At ground level the simple equation

$$\frac{\eta}{c_w} = \frac{V^3}{56{,}000}\cdot\frac{F}{N}$$

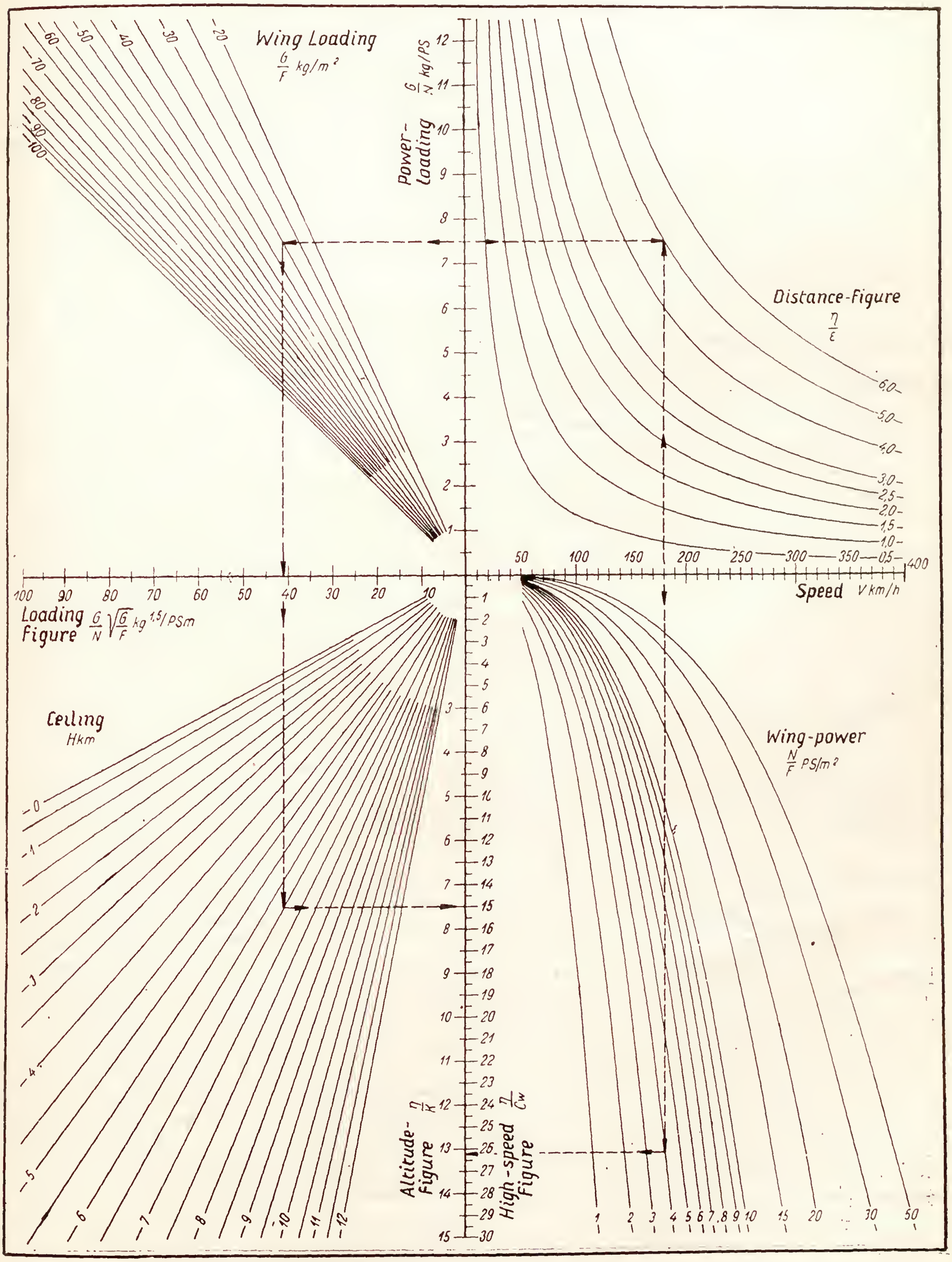
holds good. Thus the " high-speed figure " is obtained by dividing the third power of the top speed by the " wing-power," and further multiplying by $\frac{1}{7{,}000}$ of the air density at which the speed was measured. In this way the speed is converted in a manner which is equal for all aeroplanes, and as a measure of the efficiency one obtains the relation between airscrew efficiency and the smallest, *i.e.*, most favourable, drag coefficient. For very fast machines the optimum airscrew efficiency approaches very close to 1.

The drag coefficient is composed of detrimental resistance, which may be reduced to round about 0·017, the profile drag, for which one may assume an " ideal " value of 0·008, and the induced drag, which, for the low lifts that come into consideration here, may be neglected. Thus we arrive at an " ideal " value of the " high-speed figure " of 40. In machines hitherto constructed the practical value of this figure is considerably smaller, probably round about half.

---

* For this expression we suggest the English translation " Wing-power." —Ed.

† The last form is due to the fact that at ground level $\frac{\gamma_o}{g} \approx \frac{1}{8}$ kg s^2/m^4.



NOMOGRAM FOR FINDING "HIGH-SPEED FIGURE," "DISTANCE FIGURE," AND "ALTITUDE FIGURE"

The dotted lines illustrate an example. Note particularly the direction of the arrows.

The "Distance-figure."

From the last form but one of the equation for rate of climb, w, is obtained, when we take $w = 0$,

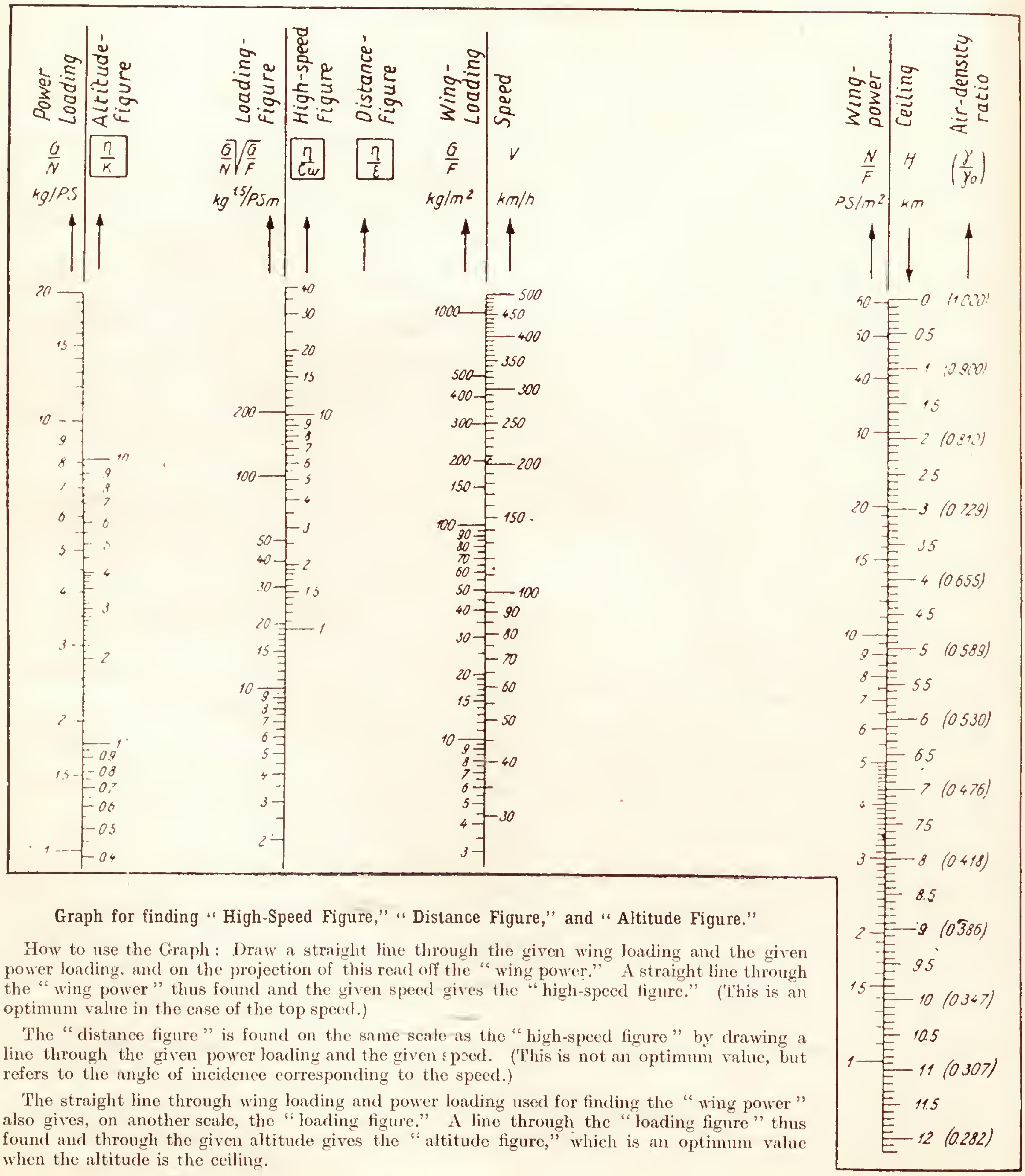
$$\text{"Distance-figure"}\ \frac{\eta}{\epsilon} = \frac{v}{75} \cdot \frac{G}{N} = \frac{V}{270} \cdot \frac{G}{N}.$$

According to this, the speed should be converted by multiplying it by $\frac{1}{270}$ of the power loading. One should bear in mind, however, that by so doing a correct scale of comparison is obtained for similar machines only, since the best gliding angle ϵ is not obtained, but a greater which corresponds to a smaller angle of incidence, *i.e.*, to a better drag coefficient, c_w, and a higher speed, v. In general, the data given in aeroplane descriptions and obtained from flying tests do not permit of giving the optimum value of $\frac{\eta}{\epsilon}$. Nevertheless, this figure should always be taken into account, especially as it gives a certain measure of the flight economy. (GV = total flying weight × speed is the "wattless" soaring power. (*Schwebeleistung*), which is in proportion to the engine power used.)

If, now, we introduce furthermore the flying range $s (km)$, the duration t (hours), the total weight of fuel carried B (kg), for a unit fuel consumption b ($kg/hp/h$), the last equation may be written:

$$\frac{\eta}{\epsilon} = \frac{1}{270} \cdot \frac{G}{N} \frac{s}{t} = \frac{b}{270} \cdot \frac{G}{B} s.$$

Thus the "distance-figure" bears its name justly, since it indicates what distance a machine can cover with a power



Graph for finding "High-Speed Figure," "Distance Figure," and "Altitude Figure."

How to use the Graph: Draw a straight line through the given wing loading and the given power loading, and on the projection of this read off the "wing power." A straight line through the "wing power" thus found and the given speed gives the "high-speed figure." (This is an optimum value in the case of the top speed.)

The "distance figure" is found on the same scale as the "high-speed figure" by drawing a line through the given power loading and the given speed. (This is not an optimum value, but refers to the angle of incidence corresponding to the speed.)

The straight line through wing loading and power loading used for finding the "wing power" also gives, on another scale, the "loading figure." A line through the "loading figure" thus found and through the given altitude gives the "altitude figure," which is an optimum value when the altitude is the ceiling.

plant of given economy, provided the proportion of fuel weight to total loaded weight $\frac{B}{G}$ is known. If the engine works with the same consumption at all air densities, the altitude does not enter into the last form of the equation at all. Consequently one can fly farthest on a given quantity of fuel at the altitude at which the attitude of the angle of incidence corresponds to the best gliding angle ϵ, *i.e.*, to the most economical flying condition.

The "Altitude-figure."

As contrasted with the "distance-figure," the "altitude-figure" again represents an optimum value. It can likewise be derived from horizontal flight, and even for any desired altitude from the last form of the equation given above for rate of climb w, when again w is taken $= O$.

$$\frac{\eta}{\kappa} = \frac{v_1}{75} \cdot \frac{G}{N}.$$

This relation of propeller efficiency η to "flight-figure" μ is, however, an optimum value only when either $N = N_{min}$, *i.e.*, the lowest power required at the altitude in question, or G is the greatest load that can be sustained at this altitude or, what amounts to the same thing mechanically, the altitude is the greatest attainable, *i.e.*, is the ceiling. For "unit speed" we must then write:

$$v_1 = \sqrt{\frac{2g}{\gamma_o} \cdot \frac{G}{F}} \sqrt{\frac{\gamma_o}{\gamma_g}} \simeq 4 \sqrt{\frac{G}{F}} \left(\frac{\gamma_o}{\gamma_g}\right)^{0.5}$$

in which γ_g is the weight of air at the ceiling. The engine power thereby falls off to the value N_g. As, however, the engine power does not fall off with altitude exactly in proportion to the air density but with its 1·25th power, *i.e.*, $N_g = N\left(\frac{\gamma_g}{\gamma_o}\right)^{1\cdot25}$, one obtains for the calculation of the "altitude-figure" from the power loading $\frac{G}{N}$ and wing loading $\frac{G}{F}$, in other words, from the "loading-figure" $\frac{G}{N}\sqrt{\frac{G}{F}}$ as well as from the ceiling air density ratio $\frac{\gamma_g}{\gamma_o}$ the

$$\text{“altitude-figure”}\ \frac{\eta}{\kappa} = \frac{4}{75} \cdot \frac{G}{N} \sqrt{\frac{G}{F}} \left(\frac{\gamma_o}{\gamma_g}\right)^{1.75}$$

$$= 0\cdot053 \frac{G}{N} \sqrt{\frac{G}{F}} \cdot 10^{0\cdot081H} = \frac{1\cdot21^H}{18\cdot8} \frac{G}{N} \sqrt{\frac{G}{F}}$$

where H is the ceiling in km., and is connected with the air density ratio according to the general relation

$$\frac{\gamma}{\gamma_o} = 10^{-0\cdot46H} \simeq 0\cdot9^H$$

Thus the "altitude-figure" is found from 0·053 times "loading figure" by multiplication by a figure which increases exponentially with the measured ceiling, and which for H = O has a value of 1, while for H = 12·2 km. (approximately the present altitude record) its value is 10.

The "altitude-figure" can also be calculated from the climb at any height when either one assumes a suitable value for the propeller efficiency η or for the "flight-figure" κ. The relation given above for the rate of climb w gives:

$$\frac{\eta}{\kappa} = \frac{v_1}{75} \cdot \frac{G}{N}\left(1 + \frac{1}{\kappa} \cdot \frac{w}{v_1}\right)$$

or

$$\frac{\eta}{\kappa} = \frac{v_1}{75} \cdot \frac{G}{N} : \left(1 - \frac{w}{75\eta} \cdot \frac{G}{N}\right)$$

Finally, the "altitude-figure" $\frac{\eta}{\kappa}$ can be expressed in a form similar to that for the "distance-figure" $\frac{\eta}{\epsilon}$ by introducing either the fuel weight B, or the unit fuel consumption b, and the greatest duration of flight $t_{gr.}$:

$$\frac{\eta}{\kappa} = \frac{b}{75} \cdot \frac{G}{B} v_1 t_{gr}.$$

Thus, for a power plant of given economy b and a given ratio of fuel weight B to total loaded weight G, the "altitude-figure" $\frac{\eta}{\kappa}$ represents at the same time the distance which can be covered at "unit speed," or by a given "unit speed," or wing loading $\frac{G}{F}$, the greatest possible duration t_{gr}.

For the conversion of measured performances these data are as little suitable as in the case of the "distance-figure," and it will be much preferable to use for this purpose the ceiling, as indicated above.

The "high-speed figure," "distance-figure" and "altitude-figure" all have the property that they are better the greater they are (as distinct, for instance, from the drag coefficient c_W, the gliding angle ϵ and the "flight-figure κ). In order to enable them to be found rapidly and with some exactness from the given or measured quantities, I have prepared the accompanying nomograms, in the production of which I owe a great deal of thanks to my assistant, Herr Dipl. Ing. Gerbert Hübner.

Fig. 1 shows a wing nomogram which can be used either with a set-square for determining the vertical and horizontal lines, or more simply draw them in on squared paper. Unfortunately, it is necessary to draw horizontal and vertical lines to each of the curves or straight lines in the four quadrants, and to swing them through a right-angle in order to read off the result on the other co-ordinate scale. In the case of more than three variables, such as when finding the "altitude-figure," it becomes necessary to go from one quadrant to another.

Much simpler (in that case) is the graph, Fig. 2, which contains all eight variables of the three quantities on but four parallel scales, the simplest possible form of such a graph. It is true that a straight-edge is required in order to read off the values, which may best take the form of a straight line scratched on a celluloid set-square, but at a pinch a horse-hair pulled out of one's armchair will do! In this graph each variable occurs but once, and the "wing-power" and "characteristic-figure" can be read off from the power loading and wing loading in one placing of the straight-edge. If the straight-edge is placed through "wing-power" and speed, or through power loading and speed, or through "loading-figure" and ceiling, one obtains one after the other the "high-speed figure," the "distance-figure" and the "altitude-figure."

AIRCRAFT PERFORMANCE

Structural Policy in Design

By J. D. North, F.R.Ae.S.

(Continued from p. 90.)

The curves given in the issue of The Aircraft Engineer for October 28, will perhaps be better understood if it is made clear that the abscissæ "total weight" implies a definite span corresponding to each weight, which can be found from the equation

$$\text{Span} = \sqrt{0\cdot6\,W}$$

and that changes in span (as in the example worked out) are dealt with by using artificial weight figures corresponding to the correct gap and correcting for the weight by manipulating the load factor. It is important to remember to multiply the factor $\frac{W_p}{W}$ read off by the artificial weight/real weight ratio to get the final result. It must equally be made clear that the values for $\frac{W_p}{W}$ imply no more change in construction than is expressly allowed for in changes of span and chord determined upon and that the gap/span ratio is assumed to remain constant; the method of allowing for alteration in the last will be discussed later. Any such curves of variation constructed from any set of chosen figures or experimental data will show when compared with other experimental data what advantage or otherwise in the matter of weight has been attained by alteration of the structural arrangements generally.

It is quite obvious from Fig. 17 (Aircraft Engineer, October 28, 1926), that it is easier to build light wings for small aeroplanes at a light structure weight than it is to build them for large aeroplanes; a point which, as we have already mentioned in earlier articles, is borne out by experience of actual construction and also by observations of natural flying machines (*e.g.*, birds). These curves, however, must not be considered to have much significance below a total weight of 1,000 lb.

As the economics of structure require the increase of structure weight with increasing $\frac{\text{span}^2}{W}$ to be set off against the reduction in induced drag, Fig. 17 should be used in conjunction with Figs. 10 and 11 (Aircraft Engineer, April 29, 1926). Referring back to the example given in last month's article, it was seen that reducing $\frac{\text{span}^2}{W}$ from $0 \cdot 6$ to $0 \cdot 5$ on an aeroplane weighing 10,000 pounds reduced the structure weight of the wings from 15·8 per cent. to 14·65 per cent., and, in consequence, gave a saving in weight of 1·15 per cent. to be set off against the increased fuel required, owing to the induced drag being greater, the balance increasing or decreasing the military load as the case may be. The amount of this extra fuel will depend on the brake thermal efficiency of the engine and the propeller efficiency, and also the operational indicated air speed. For example, if the operational true speed is 100 m.p.h. at 18,000 ft., the operational indicated air speed is about 75 m.p.h.; the induced drag would be increased from roughly, 295 lb. to 365 lb., an increase of 70 lb. This corresponds to, roughly, 18·7 thrust horse-power, and at 70 per cent. propeller efficiency to 26·7 brake horse-power, and hence about 17·4 lb. for fuel tankage per hour of flight. A range of 650 miles will cause the extra fuel to balance the weight saving on the wings. Actually, as weight of wings affects structure to a lesser degree than weight of fuel, the advantage is really greater to the extra span. The advantage to be gained on climb (and climb would be at an indicated speed not exceeding 75 m.p.h.) is obvious.

One may note here how inextricably the economics of the aeroplane are bound up with operational requirements, and how any arbitrary fuel load specified to satisfy certain definite needs as to operational speed and range may tend to produce an uneconomical aeroplane. The greatest possible latitude requires, therefore, to be given to the designer in interpreting operational requirements. The starting point for the aeroplane designer must be the operational results aimed at. The complexity of factors governing the economies of design render any intermediate interpretation of operational requirements *dangerous and misleading.*

It has already been stated that the curves of Fig. 17 are similarity curves based on a definite value for gap/span ratio of about 0·11, and that the correction applied for change of aspect ratio assumed that the gap/span ratio remained unaltered. The influence of this ratio on induced drag was fully explained in an earlier article (29.4.26) and from Fig. 11 it will be seen that the value of σ corresponding to a gap/span ratio of 0·11 is about 0·64 hence $\frac{2}{1+\sigma} = \frac{2}{1 \cdot 64} = 1 \cdot 24$ and this factor has been used to correct the values of lift/induced drag of Fig. 10 in the calculations just previously made.

Gap, however, is frequently determined from other than aerodynamic considerations. In the case of single seater fighters the position of the top plane is generally fixed by the angle which the plane subtends at the pilot's eye, and the arrangement chosen which will give the least obstruction to the pilot's forward and upward view. The position of the bottom plane, to avoid interference, is usually fixed at the bottom of the body and hence since to keep down drag the body is made as small as consistent with a good form, the gap is determined from considerations having no bearing on induced drag. In twin-engined aeroplanes gun-fire and backwards view control the gap, and in some large aeroplanes, shed clearance has actually been a deciding limitation. It is very nearly true to say of military aeroplanes that the choice of gap is independent of the span. Fortunately, however, reasonable aeroplane arrangements give suitable values for gap/span ratio, *e.g.*, between 0·1 and 0·15, with values of σ between 0·66 and 0·56, giving correction factors of approximately 1·20 and 1·28 respectively. It will be noticed that even the enormous change of gap (50 per cent. increase), makes a comparatively small difference to the induced drag. In the example given in last month's article the gap/span ratio would only be altered about 10 per cent., if the gap were kept constant when the span was reduced, and the decrease of induced drag due to the alteration would only be about 1·5 per cent.; this would be about 5·5 lb. under the operational conditions considered.

The influence of change of gap/span ratio is more complicated and quantitatively depends on the type of structural arrangement, *i.e.*, proportions, gap, span, chord and strut spacing, small variations of which are to be considered.

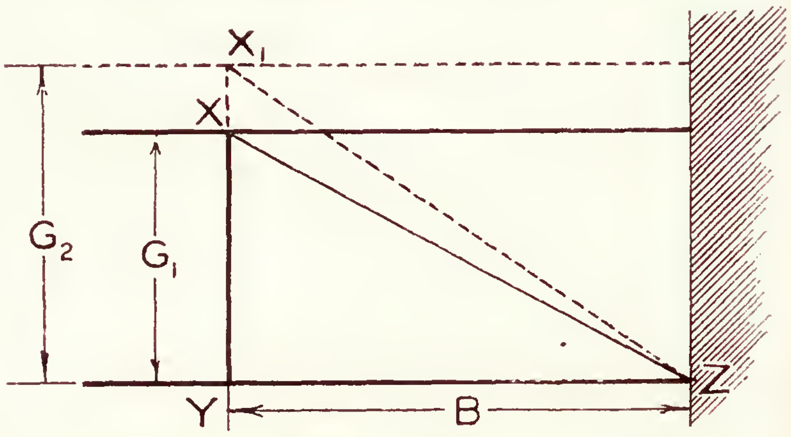


Fig. 19.

Consider the arrangement shown in Fig. 19.

This shows a single bay structure. The length of the bay is B and does not change; the gap changes from G_1 to G_2

Strut.—Consider first the strut: we may either retain the same external profile (supposing the strut to be hollow) and make the walls thicker, or we may enlarge the external profile so as to keep the slenderness ratio constant (constant l/k). In the first case, if the strut is of "high tensile" metal construction within the limits of ordinary aeroplane practice, the value of k is nearly independent of the gauge of material of which the strut is composed. In other words it may be assumed that the thickness of the material is so small compared with the cross-sectional profile dimensions that when the strut is made longer and of heavier material k remains unaltered. For a slenderness ratio appropriate to interplane struts for the strut to be capable of taking the same load (which is of course unaltered) when the gap is increased the cross-sectional area must be increased in the ratio $\left(\frac{G_2}{G_1}\right)^2$ and hence the weight per foot run increases in the same ratio, but as the length is increased the weight

$$W \propto \left(\frac{G_2}{G_1}\right)^2 \times \frac{G_2}{G_1} \propto \left(\frac{G_2}{G_1}\right)^3$$

This is for the strut proper; of course the weight per foot run of the strut fairing will remain unaltered and the weight will vary as $\frac{G^2}{G_1}$

If, however, the slenderness ratio be kept constant, the weight of the strut will vary as $\frac{G_2}{G_1}$, but the weight of the fairing will vary as $\left(\frac{G_2}{G_1}\right)^2$ since the width and breadth of the strut have increased as $\frac{G_2}{G_1}$.

The drag of the strut will, of course, have increased in the ratio $\frac{G_2}{G_1}$ in the first case and $\left(\frac{G_2}{G_1}\right)^2$ in the second.

Wires.—From an inspection of the figure XYZ and X_1YZ are stress diagrams for the two systems. The lengths G_1

and G_2 are of course representing applied loads of the same magnitude.

Hence the load in the wire and consequently its cross-sectional area

$$\propto \frac{G_1}{G_2} \frac{\sqrt{G_2^2 + B^2}}{\sqrt{G_1^2 + B^2}}$$

and the length

$$\propto \frac{\sqrt{G_2^2 + B^2}}{\sqrt{G_1^2 + B^2}}$$

$$\therefore \text{The weight of wire} \propto \frac{G_1}{G_2} \cdot \frac{G_2^2 + B^2}{G_1^2 + B^2}$$

This result cannot of course be considered quantitatively without a knowledge of the ratio of the gap to the bay length (G:B).

If in the initial case $G = B$ and in other cases $G = 0{\cdot}9B$, $0{\cdot}8B$, $0{\cdot}7B$, $0{\cdot}6B$ and $0{\cdot}5B$.

the ratios of the weights of wires will be

1, 1·005, 1·025, 1·063, 1·133 and 1·25 respectively.

The ratio of the weight of wires in changing the gap by 0·1 B taking each of the above cases in turn as the *original* are then

1·005, 1·02, 1·038, 1·065, 1·078.

It is thus apparent that for the order of changes in gap/span ratio the reduction in wire weight will be small from 0·5 per cent. to 3 per cent. in different bays, according to their geometry. The resistance of the wires will be reduced in direct proportion to the weight reduction supposing the fineness ratio of the cross section of the wires to be constant.

Spar.—In the case of the overhang the spar is, of course, unaffected. In the bay the load on the spar due to compression component from the lift wire varies as $\frac{G_1}{G_2}$.

If a is the area of the spar then $c_1 a \propto$ end load $c_2 a \propto$ primary bending, $c_3 a \propto$ bending due to end load.

Then $c_1 a \propto \frac{G_1}{G_2}$ and $c_2 a$ is constant.

Since end load bending effect varies both with end load and deflection an approximation may be taken as $c_3 a \propto \left(\frac{G_1}{G_2}\right)^2$, the actual index, however, would really depend on the relative importance of the primary and secondary bending.

Then a and consequently the weight of spar

$$\propto c_2 + c_1 \frac{G_1}{G_2} + c_3 \left(\frac{G_1}{G_2}\right)^2$$

In a typical case for a single bay machine values for

$c_1 = 0{\cdot}37$

$c_2 = 0{\cdot}40$

$c_3 = 0{\cdot}23$ have been found.

Hence in this case

$$W \propto 0{\cdot}40 + 0{\cdot}37 \frac{G_1}{G_2} + 0{\cdot}23 \left(\frac{G_1}{G_2}\right)^2$$

Appropriate values for the constants for multi bay construction can similarly be found, and the values must be appropriate to the structure chosen for the similarity curve.

Supposing the anti-lift wire and bottom spar to be determined by upside down flight conditions, the same expressions will apply.

As example, let us take $\frac{G_1}{G_2} = 0{\cdot}9$.

$$\text{Then } W \propto 0{\cdot}40 + 0{\cdot}37 \times 0{\cdot}9 + 0{\cdot}23 \times 0{\cdot}81$$
$$W \propto 0{\cdot}92$$

i.e., the weight of the spars in the bay is reduced 8 per cent.

From previous work the weight of the wires, 2 per cent., and the weight of the struts is increased 27 per cent. for constant k.

The weight of the fairing is increased 10 per cent. for constant k.

If the fairing is $\frac{1}{3}$ the weight of the strut, the struts are increased roughly 20 per cent.

For constant l/k the struts and fairings are increased in weight about 13 per cent. The optimum arrangement is probably a mean of these, say, 17·5 per cent.

For the original numerical example (changing from 0·6 to 0·5 span²/W) reasonable values for relative weights of external bracing, struts and spars (less overhang) would be as follows :—

External bracing	7
Struts	10
Spars	20
	—
	37

By the change of gap we have approximately

$$7 \times 0{\cdot}98 + 10 \times 117{\cdot}5 + 20 \times 0{\cdot}92$$
$$6{\cdot}86 + 11{\cdot}75 + 18{\cdot}4 = 37{\cdot}01$$

We reach here the remarkable result that the change of gap of 10 per cent. *has made no difference to the weight of the wings*, the increased weight of the struts having just balanced out the reduced weights of the spars and wires.

This case has not been adjusted for the purpose of arriving at this result, but reasonable values have been chosen based on statistical evidence of metal construction. No great significance need attach to the closeness of the two weights, except that it affords evidence that with *reasonable wing arrangements* (*i.e.*, not too unlike the practice of good designers) the influence of change of gap is not very important. The reader may easily extend the methods here used to statistical examples in which he is interested.

By analogy it may be seen that the influence of chord on the primary structure is not very important. Change of chord reduces the drag loads in the spars and the wire loads, but drag struts are increased in weight. The case is actually far more complicated than the lift structure, but the influence of drag loads on spars is only about 20 per cent. of that of the primary loads.

(*To be continued.*)

TECHNICAL LITERATURE.

AERONAUTICAL RESEARCH COMMITTEE REPORTS.

REPORT ON THE ACCELERATED AGEING OF "Y" ALLOY.

By S. L. Archbutt, F.I.C., and J. D. Grogan, B.A.

Work performed for the Engineering Research Board of the Department of Scientific and Industrial Research.

Presented by Dr. W. Rosenhain, F.R.S., Superintendent, Metallurgy Department, National Physical Laboratory.

R. & M. No. 1038 (M.47) (10 pages and 8 diagrams). April, 1926. Price 9*d*. net.

The investigation here described has been carried out to discover, if possible, a method whereby the normal age-hardening period of eight days might be shortened, in order to remove the inconvenience caused in foundry practice by the period of waiting.

The progress of age-hardening has been studied on both chill cast and wrought material by means of tensile and Brinell hardness tests. The effect of temperatures of 150° C. and 100° C. in the air of an electric muffle was first tried. Hardening proceeded rapidly at 100° C., and this temperature was therefore used in subsequent work, boiling water being chosen as the tempering medium.

In the case of the wrought alloy, half an hour at 100° C. is sufficient substantially to complete the age-hardening.

Slight differences only in results have been observed between material which, after quenching, has been tempered (1) immediately, and (2) after a few hours' air-ageing. Material tempered (say, at 100° C.) for a period too short to complete the ageing process, continued to age in air, finally attaining physical properties similar to those of normally air-aged material or of completely-tempered material. Tempering for longer periods up to six hours does not produce any further change in mechanical properties.

With the cast alloy results have been somewhat irregular and further investigation is needed. Excellent results have, however, been obtained from chill cast bars treated at 100° C. for two hours.

WIND-TUNNEL TESTS ON A WING COVERED WITH MONEL METAL GAUZE.

By F. B. BRADFIELD, Maths. and Nat. Sci. Trip.

R. & M. No. 1032 (Ae. 224) (2 pages and 1 diagram). February, 1926. Price 4*d.* net.

In connection with the production of all-metal aeroplanes, the use of monel-metal gauze as a wing covering has been suggested. The gauze might be either undoped or doped. If doped, the aerodynamic properties of a wing covered with gauze or with fabric would differ little, provided the doped fabric was airtight. If a coarse mesh gauze were used, the surface when doped might be rough; but with the fine mesh samples supplied for wind-tunnel test, the surface would be as smooth as doped fabric, and there is no reason to believe that the lift or drag would be in any way affected. Lift, drag and pitching moments have been measured at a wind speed of 60 ft./sec., for a wing of R.A.F. 31 section, 13 in. by 52 in., covered with undoped gauze of 100 mesh, 40½ S.W.G.

The porosity of the undoped gauze makes it entirely unsuitable for a wing covering. The lift rises steadily from — 3·5° to 27·5° (the largest angle tested), but at this latter angle k_L is only 0·22. The lift/drag ratio is slightly less than 1 over most of the range.

The lift and drag with the gauze doped have not been measured. On a gauze as fine as 100 mesh it seems probable that the doped surface will be as smooth as doped fabric; but, if the use of a coarse-mesh gauze is contemplated, the doped surface may be rough. In this case further wind-tunnel tests may be required.

NOTE ON A HOT-WIRE SPEED AND DIRECTION METER.

By L. F. G. SIMMONS, B.A., A.R.C.Sc., AND A. BAILEY, M.Sc., A.M.Inst.C.E.

R. & M. No. 1019 (Ae. 220) (7 pages and 17 figs.). February, 1926. Price 9*d.* net.

A form of hot-wire speed and direction meter suitable for use over a large range of wind speed, and possessing a high order of directional sensitivity, is described at some length. Its development is traced from the initial stages of a wire set along the wind to its ultimate form consisting of a grouping of three wires.

Measurements of air flow behind a finite aerofoil made with the three-wire instrument are included for purposes of comparison with corresponding measurements obtained with the standard form of tube instrument.

A special form of hot-wire speed and direction meter has previously been described by one of the writers,* and the present instrument is considered to be a much more satisfactory instrument, and to have met the needs of recent exploration experiments in the N.P.L. wind tunnels.

TEST OF TWO AEROFOILS, R.A.F.27 AND R.A.F.28.

By A. S. HARTSHORN, B.Sc., AND H. DAVIES, B.A.

R. & M. No. 1027 (Ae. 225). (10 pages and 6 figs.). April, 1926. Price 9*d.* net.

A number of wing sections designed in accordance with the theory given in R. & M. 946* have been tested; of these sections, R.A.F. 25 and 26 are thin and R.A.F. 30 to 33 are thick. The two aerofoils tested in the present experiments are intermediate between the thin and the thick sections.

R.A.F. 27 is a symmetrical section of a maximum thickness of 10 per cent. of the chord. R.A.F. 28 is derived from this by curving the centre line with a rise of 0·02 chord, the curvature decreasing to zero at the trailing edge.

Lift and drag have been measured over a speed range from 32 ft./sec. to 120 ft./sec., and the pitching moments at 60 ft./sec.

The main characteristics at VL = 40 are :—

Aerofoil	k_L max.	k_D min.	k_M at no lift	L/Dmax.
R.A.F. 27 ...	0·400	0·0048	0	18·2
R.A.F.28 ...	0·492	0·0053	— 0·022	22·0

At the higher speeds tested the maximum lift is considerably increased, R.A.F.28 appears to be a suitable wing for biplane construction, and aerodynamically is better than R.A.F.31.

It is proposed to fit R.A.F.28 with a slotted leading edge, and to design a slot and aileron control.

These Reports are published by His Majesty's Stationery Office, London, and may be purchased directly from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, W.C. 2; 28, Abingdon Street, London, S.W.1; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; or 120, George Street, Edinburgh; or through any bookseller.

AMERICAN NATIONAL ADVISORY COMMITTEE REPORTS.

The National Advisory Committee for Aeronautics in the United States of America corresponds to our own Aeronautical Research Committee. Two distinct classes of reports are issued, the first being known as *Technical Reports.* These Technical Reports are printed, and are illustrated by photographs and/or drawings. The second class are known as *Technical Notes,* and are issued in mimeographed form so as to enable them to be rapidly distributed to a somewhat smaller, but directly interested, circle of readers. Copies of the Reports and Notes may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., U.S.A., but the American N.A.C.A. have a Technical Assistant in Europe, whose office is at 18, Rue Tilsitt, Paris, from whom copies can usually be obtained thus saving a certain amount of time.

The average price of the Technical Reports is 10 cents, which is, of course, remarkably cheap in view of the information contained, and in some instances the price is as low as 5 cents.

THE AERODYNAMIC CHARACTERISTICS OF SEVEN FREQUENTLY USED WING SECTIONS AT FULL REYNOLDS NUMBER.—REPORT No. 233.

By MAX M. MUNK and ELTON W. MILLER, Langley Memorial Aeronautical Laboratory.

This report contains the aerodynamic properties of wing sections U.S.A.5, U.S.A.27, U.S.A.35, U.S.A.35B, Clark Y, R.A.F.15, and Göttingen 387, as determined at various Reynolds Numbers up to an approximately full-scale value in the variable density wind tunnel of the National Advisory Committee for Aeronautics.

It is shown that the characteristics of the wings investigated are affected greatly and in a somewhat erratic manner by variation of the Reynolds Number. In general, there is a small increase in maximum lift and an appreciable decrease in drag at all lifts.

THREE METHODS OF CALCULATING RANGE AND ENDURANCE OF AIRPLANES.—REPORT No. 234.

By WALTER S. DIEHL, Bureau of Aeronautics, Navy Department.

This report, which was prepared for the National Advisory Committee for Aeronautics, develops new equations which give the range and endurance of airplanes with an accuracy equal to that obtained from a step-by-step integration of the flight. A method of obtaining equally satisfactory results from Breguet's equations is also given in detail. A third method of calculating range and endurance, derived by the writer for use in routine estimating in the Bureau of Aeronautics, is also given in full.

The report contains tables and curves arranged for convenient use, and illustrates the three methods by comparative estimates.

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* R. & M. 777.

* R. & M. 946. The theory of the design of aerofoils with an analysis of the experimental results for the aerofoils R.A.F. 25, 26, 30 to 33. By Glauert.

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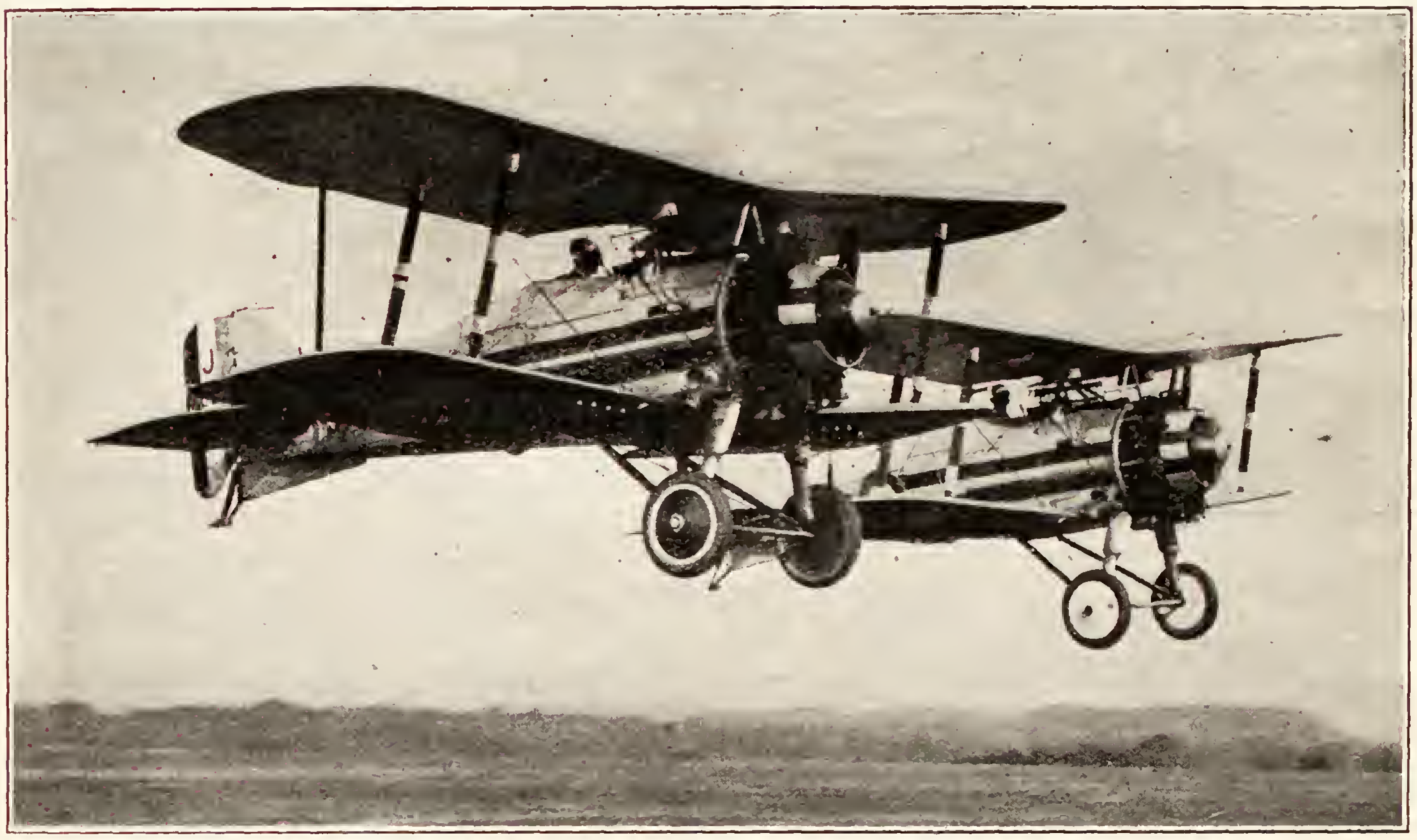

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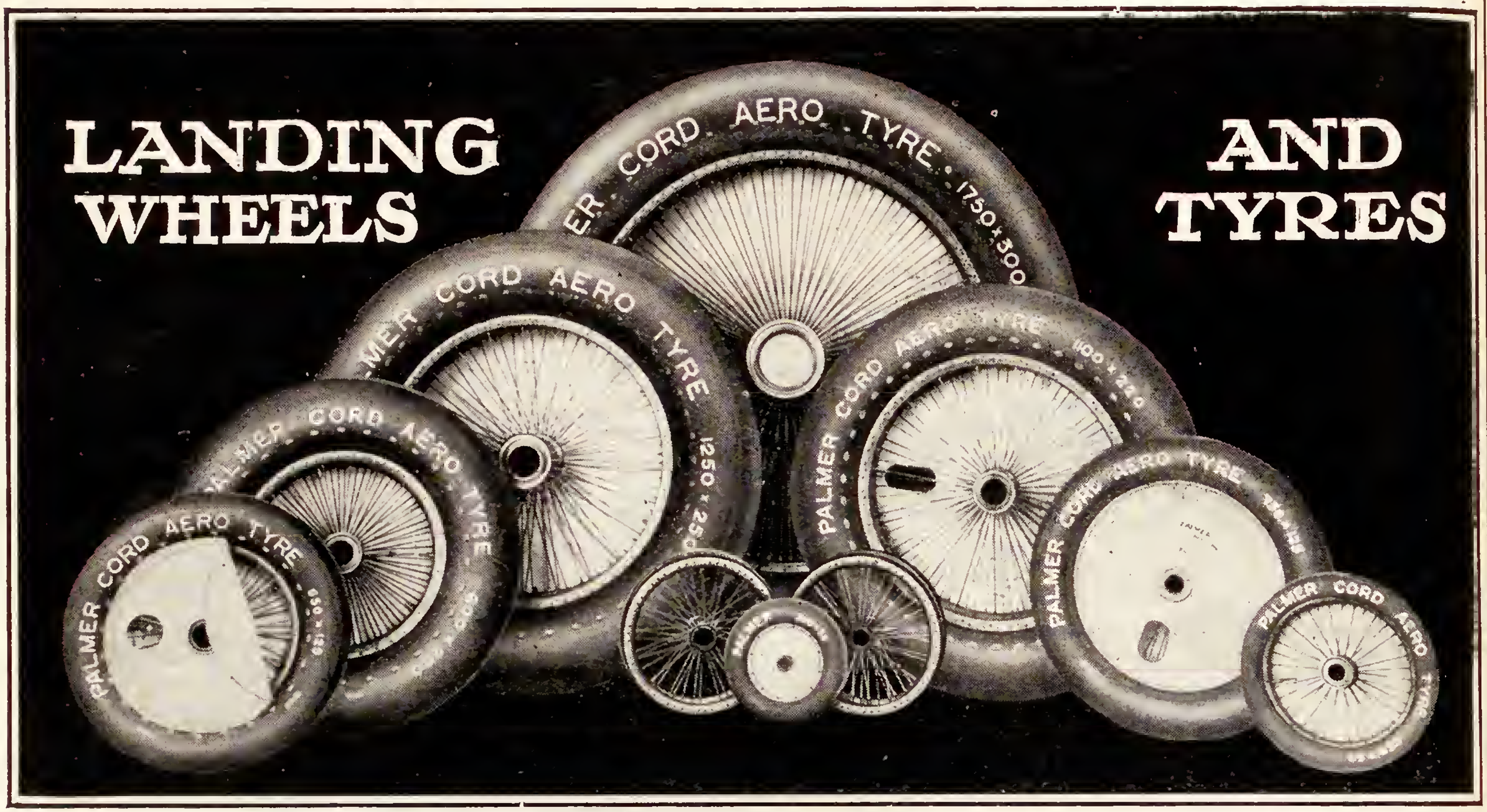
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300 × 60	16	111.12	25.4	Central
450 × 60	30	89.	31.75	Central
"	172	130.	38.09	Central
575 × 60	21	160.	28.	Central
"	180	150.	38.09	104/46
"	186	120.	34.92	Central
"	190	150.	38.09	Central
650 × 65	78	178.	44.45	132/46
"	79	178.	44 45	Central
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46
600 × 75	21	160.	28.	Central
"	180	150.	38.09	104/46
"	186	120.	34.92	Central
"	190	150.	38.09	Central
700 × 75	78	178.	44.45	132/46
"	79	178.	44.45	Central
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46
700 × 100	77	178.	44.45	132/46
"	92	185.	55.	135/50
"	95	185.	55.	Central
"	99	178.	38.89	132/46
		m/m	m/m	m/m
700 × 100	112	150.	38.09	Central
"	176	178.	44.45	Central
"	179	178.	55.	132/46
650 × 125	119	178.	55.	132/46
"	147	178.	55.	Central
"	188	120.	34.92	Central
750 × 125	77	178.	44.45	132/46
"	92	185.	55.	135 50
"	95	185.	55.	Central
"	99	178.	38.89	132/46
"	112	150.	38.09	Central
"	176	178.	44.45	Central
"	179	178.	55.	132/46
800 × 150	161*	185.	55.	135/50
"	162*	185.	55.	Central
"	163*	185.	66.67	135/50
"	169†	185.	55.	135/50
"	177	185.	55.	135/50
"	183	185.	55.	Central
"	211*	185.	60.32	135/50
1000 × 150	167	185.	55.	125/60
"	174	250.	80.	Central
"	182	185.	55.	Central
		m/m	m/m	m/m
1000 × 150	187	220.	66.67	Central
"	201	185.	60.32	125/60
"	210	185.	60.32	Central
1000 × 180	148	220.	80.	Central
"	149	185.	55.	Central
"	155	220.	66.67	Central
"	166	185.	55,	125/60
900 × 200	107	185.	55.	Central
"	108	185.	55.	125/60
"	128	220.	66.67	Central
"	137	250.	80.	Central
"	157	185.	80.	Central
"	202	185.	60.32	Central
1100 × 220	134	220.	66.67	Central
"	136	250.	80.	Central
975 × 225	192	185.	60.32	Central
"	194	185.	55.	125/60
1250 × 250	133	250.	80.	Central
"	154	304.8	101.6	Central
1500 × 300	115	304.8	101.6	Central
"	126	304.8	152.4	Central
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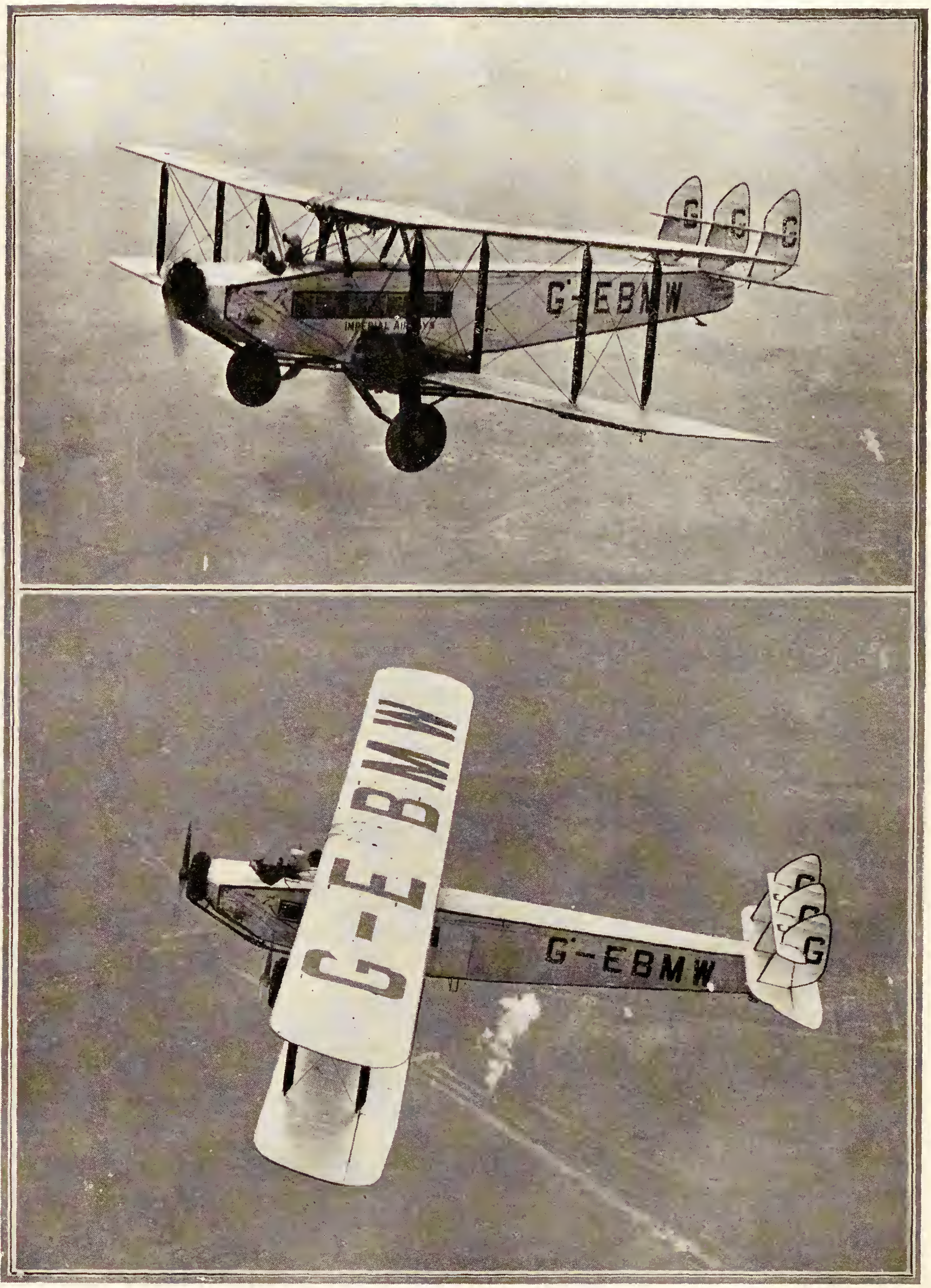

["FLIGHT" *Photographs*

THE CAIRO-KARACHI AIR ROUTE : Two aerial views of the de Havilland "Hercules," with three Bristol "Jupiter" engines, taken during a test flight in the neighbourhood of Stag Lane Aerodrome.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

FEDERATION AERONAUTIQUE INTERNATIONALE

World's Records

AT the Conference of the Federation Aeronautique Internationale held in Rome in October last, the Royal Aero Club was represented by Lieut.-Col. M. O'Gorman, C.B.

It was decided that the carrying of parachutes is compulsory in all attempts for records, with the exception of speed records. A minimum weight of 10 kgs. per parachute must be allowed, and is not included in the "weight of merchandise" carried.

Greatest Load carried to 2,000 m.—The present record is 6,000 kgs. It was decided that additional load should go up in steps of 500 kgs.

These regulations will come into force on April 1, 1927.

Schneider Cup.—The proposal of the Royal Aero Club that the Schneider Cup should be competed for bi-annually instead of annually was adopted.

Subsequent to this decision the race for the Schneider Cup took place in America, and Italy won the Cup. The next race will therefore be held in 1928, in Italy.

Women Pilots.—It was decided that women pilots are eligible for all records. The question of creating a distinct class for women pilots was referred to the January conference, to be held in Paris.

The following questions were also referred to the Paris Conference to be held in January :—

(1) Uniform method of arriving at value of aeroplanes for customs purposes.
(2) Slow-speed requirements for aeroplanes attempting high-speed records.
(3) Classification for light aeroplanes for record purposes.
(4) Instruments for recording temperature in height records.
(5) Automatic timing for high-speed records.

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H. E. PERRIN, Secretary.

IMPERIAL AIR COMMUNICATIONS

THE report of the Air Communications Special Sub-Committee, of which Sir Samuel Hoare, Secretary of State for Air, was chairman, one of the several committee reports issued in connection with the Imperial Conference, was published on November 22. In our issue for November 4 we gave a report of the discussion on Imperial Air Communications, and this week we give the texts of the report referred to above.

The Sub-Committee heard evidence from various experts of the Air Ministry in London in regard to certain matters discussed, including the technical aspects of airship development and the meteorological organization required for the purpose of experimental flights with a view to the subsequent operation of regular airship services.

The Sub-Committee, having reviewed the present state of air communications in the Empire in the light of the comprehensive information supplied to the Imperial Conference by the Secretary of State for Air, have considered what concrete steps can be taken to further the development of Imperial air services in the immediate future ; and, as a result of their deliberations, submit the following report :—

I. The Sub-Committee are convinced that the development of Imperial air communications, both by airship and aeroplane, is of sufficient importance to merit the early and continuous attention of the Governments of the several parts of the Empire.

II. Accordingly, the Sub-Committee recommend that the Imperial Conference should place on record the following resolutions :—

The Imperial Conference, being impressed with the great benefits, both political and commercial, to be derived from the speeding up of Imperial communications by air—

(1) Takes note with satisfaction—

(*a*) Of the prospective opening of a regular air service between Cairo and Karachi and an experimental service between Khartoum and Kisumu.

(*b*) Of the decisions of His Majesty's Government in Great Britain and in the Union of South Africa to carry out a series of experimental flights to connect so far as possible with this latter service ; and

(*c*) Of the decisiou of His Majesty's Government in Australia to arrange for flights by the Royal Australian Air Force from Australia towards Singapore to link up with similar flights of the Royal Air Force from Singapore towards Australia.

(2) Recommends that the development of other air services should receive the early consideration of the Governments concerned ; and that in this connection particular attention should be paid to the maintenance of existing and the construction of new aeroplanes so far as local resources permit with a view to the ultimate creation of a complete system of Empire air routes.

(3) In view of—

(*a*) The great potentialities of the airship ; and

(*b*) The present lack of constructional and other facilities which must prove a serious obstacle to the early development of regular airship services—

recommends that the Governments of the Dominions concerned and of India should examine the possibility of erecting nucleus mooring mast bases to be available for demonstration flights in 1928-29 by the two airships now under construction, and of instituting such preliminary meteorological investigations as may be necessary to facilitate these demonstration flights ; and that His Majesty's Government in Great Britain should consider the erection of a second shed at the Royal Airship Works at Cardington.

(4) Recommends that an Imperial Air Conference should be held in 1928 or 1929—the precise date to be determined later—at some suitable Imperial centre, to report progress and to consider what further action can be taken for the development of Imperial air communications ; and takes note with appreciation of the invitation of the Dominion of Canada that this Conference should take place in Canada.

III. Finally, the Sub-Committee are of opinion that the present system of communicating information in regard to civil aeronautics should be continued and recommend that, with a view to ensuring still closer co-ordination throughout the Empire, exchanges should be effected from time to time between the Civil Aviation officials of Great Britain and the Dominions and India so far as limitations of staff and local considerations permit.

At the final meeting of the Imperial Conference, on November 22, the following conclusions, regarding Air communications, were reached :—

(*a*) The Conference takes note with satisfaction of the substantial progress that has been made since 1923 in building up the Air Forces and resources of the several parts of the Empire.

(*b*) Recognising that the fullest mobility is essential to the effective and economical employment of air power, the Conference recommends, for the consideration of the several Governments, the adoption of the following principle : the necessity for creating and maintaining an adequate chain of air bases and refuelling stations.

(*c*) Impressed with the desirability of still closer co-ordination in this as in all other spheres of common interest, and in particular with the advantages which should follow from a more general dissemination of the experience acquired in the use of this new arm under the widely varying conditions which obtain in different parts of the Empire, the Conference recommends for consideration by the Governments interested the adoption in principle of a system of mutual interchange of individual officers for liaison and other duties, and of complete air units, so far as local requirements and resources permit.

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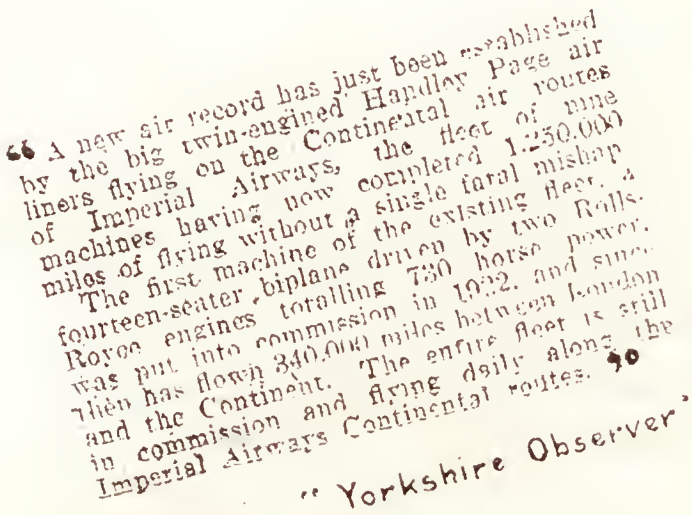

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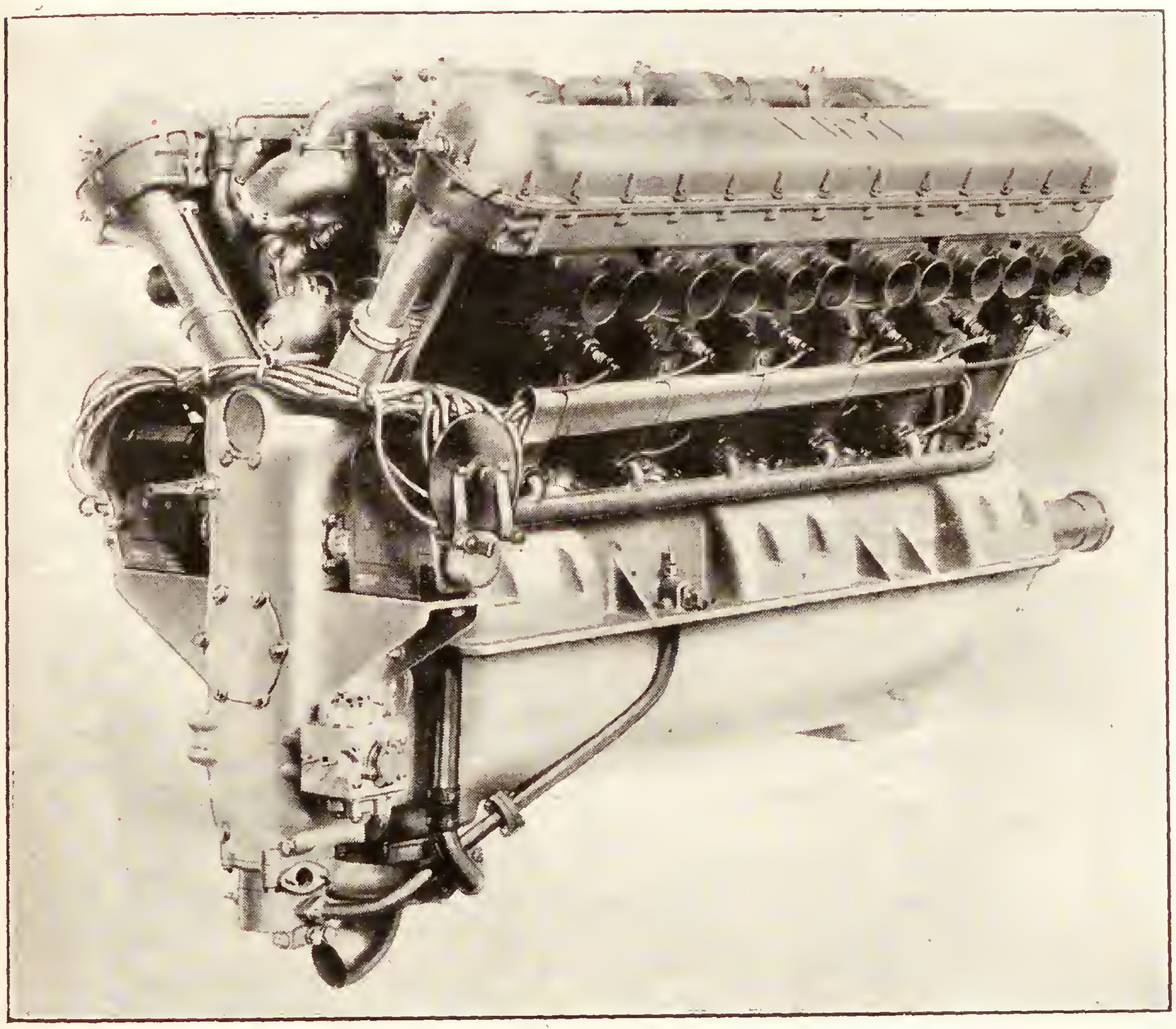
THE 882 H.P. FIAT AERO ENGINE

THIS week we are able to publish a photograph of the Fiat engine fitted in the Macchi low-wing monoplane which won the race for the Schneider Trophy at Norfolk, Virginia, at an average speed of 246·496 m.p.h. A photograph of the machine was published in FLIGHT last week.

The Fiat engine, it will be seen, is a water-cooled 12-cylinder engine of fairly orthodox design. The angle between the cylinder banks is 60°. The engine, known as the type A-S.2, develops 882 b.h.p. at a speed of 2,500 r.p.m., and the weight of the engine, including oil, water, pump and starter, is 412·1 kgs. (907 lbs.), giving a weight of 1·025 lb./h.p. The bore is 140 mm. and the stroke 170 mm., giving a capacity of 31·4 litres. The compression ratio is stated to be 6 to 1.



Winner of the Schneider Cup Seaplane Race: Three-quarter rear view of the 882 h.p. Fiat engine, type A-S.2.

The overall length of the Fiat A-S.2 engine is 1·584 m. (62·3 in.), the width 0·720 m. (28·35 in.), and the height 0·948 m. (37·35 in.). This engine will be shown at the Paris Aero Show.

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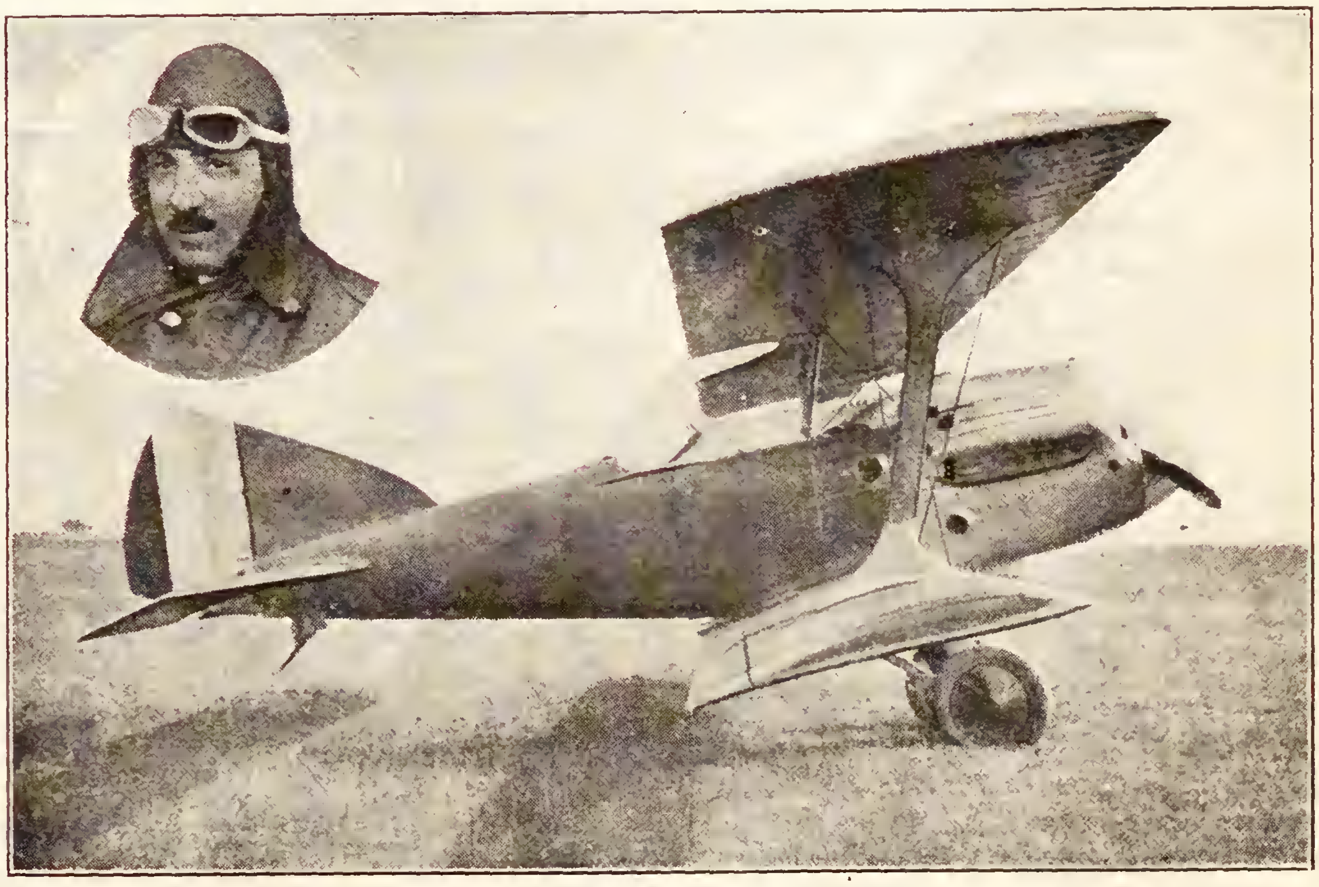

A Record Breaker: The Bleriot-Spad, with 450 h.p. Lorraine-Dietrich engine, on which the French pilot, Jean Callizo, made a world's record altitude flight of 12,442 m. (40,810 ft.) on August 23. This flight, which lasted 2 hrs. 25 mins., thus beat his previous record of 12,066 m. (40,783 ft.) created on October 10, 1924.

FROM THE FOUR WINDS

A New Use for Aircraft

In an effort to increase the numbers of ducks and muskrats in the northern area of the Province of Manitoba by providing additional sustenance, the Provincial Department of Agriculture has sent north sacks of wild rice to be sown by aeroplane over the vast duck marsh known as Moose Lake and Cedar Lake. This vast marsh, 20 miles wide by 90 miles long, is the largest duck marsh on the Continent, and also constitutes the largest muskrat harbourage.

Cairo–Karachi Air Service

Final preparations for the inauguration of the Cairo–Karachi Air Service are being hurried forward, and Maj. Woods Humphrey left England for Egypt yesterday in this connection. The text of the agreement between the Air Council and Imperial Airways regarding this service was issued on November 15, and the provisions therein follow in general those of the agreement of May, 1924, relating to the European services, with, of course, modifications necessitated by the conditions of the new service. Provision is made, for a period of five years, for the establishment of a fortnightly service starting not later than January 1 next. Sir Samuel Hoare and Lady Maud Hoare, it will be remembered, leave Croydon in the first of the three-engined (Bristol "Jupiter") D.H. "Hercules" air liners, which will operate on this route, for Cairo and Karachi, on December 27, to inaugurate the service. The route is divided into two sections: Section I, from Cairo to Basra via Gaza, Ziza, Rutbak, Wells and Baghdad; and Section II, from Basra to Karachi via Bushire, Bandar Abbas, and Chabar. Passengers, mails and goods will be carried, but at first passengers will be carried only over Section I until experience has been gained over the whole route, when the second section will be opened—probably by April—commercially.

A New U.S. Air Transport Service

An important contract in connection with commercial aviation has just been signed in the United States, between the American Railway Express Co., and the National Air Transport, Inc. The object of the agreement between these two companies is the establishment of air services, for the transportation of express packages, between New York and Chicago, and Chicago and Dallas, with a service to intermediate points on both lines. Mr. Henry Ford is indirectly interested in this scheme, and is represented on the board of Directors of the Air Transport Co. by one of his engineers. The new service is expected to start operations on April 15 next, and the service will be a day and night one, and will carry mail as well as express packages. This is one of the first air services devoted entirely to the transport of express goods, and will probably form the commencement of a network of such lines throughout the States.

Aerial Coastguards

An aerial coastguard unit has been formed in the United States, comprising five seaplanes, under the command of Lieut.-Comdr. E. S. Stone—the pilot of the NC4 flying-boat which made the Transatlantic flight in 1919—three of which will be stationed at Ten Pound Island, Mass., and two at Cape May, N.J.

Another Flying Club for London

We are informed that efforts are being made to form an "Independent Private Light Aero Club" in London. The moving spirit of this scheme is Mr. Douglas Usher, who is willing to offer his services as organising secretary and flying instructor in the event of the formation of this club being made possible by the necessary support. It is proposed that there should be an annual subscription of £4, but that there should be obtained, first of all, a register of 100 supporters at a registration fee of 2*s*. 6*d*. (to cover preliminary expenses), who will ultimately agree to become members, at a minimum entrance fee of £1, (payable, together with annual subscription, as soon as full 100 supporters have been registered). It is proposed to purchase a D.H. "Moth" and necessary accessories, and it is suggested that arrangements be made with the De Havilland Aircraft Co., Ltd., regarding maintenance of machine and use of aerodrome. The charges for flying will be as follows:—(*a*) £1 per hour for flying instruction; (*b*) 15*s*. per hour for solo flying; (*c*) 10*s*. per hour for joy-riding. These charges include cost of instruction, petrol, oil, and damage to machine. If any of our readers may be interested in this scheme, further particulars may be obtained from Mr. Douglas Usher, 268, St. Paul's Road, Canonbury, London, N.1.

Recent World Records for Seaplanes

On November 17, Major Bernardi, the winner of the Schneider Cup, flying the Macchi M39 monoplane over a 3-km. course at Norfolk, Virginia, averaged a speed of 416·5 km.p.h. (258·8 m.p.h.), thus easily beating Lieut. Doolittle's previous records.

In Germany, two records were recently created, with the help of a British engine, on the Heinkel-Napier seaplane (winner of the Warnemunde competition), when Capt. von Goronau attained an altitude of nearly 12,000 ft. with a load of 2,204·5 lbs., and 18,500 ft. with 1,102 lbs.

Although Great Britain has not yet obtained any world records, she helps to get them, as evident from above, and by the recent seven records obtained at Lake Maggiore, by the Savoia S55 flying boat, which was fitted with "K.L.G." sparking plugs. These records were as follows:—With 500 kgs. (1) (Distance), 950 kms.; With 1,000 kgs. (2) (Duration), 5 hrs. 41 mins. 7 secs.; (3) (Distance), 950 kms.; With 2,000 kgs. (4) (Duration), 5 hrs. 41 mins. 7 secs.; (5) (Distance), 950 kms.; (6) (Speed), 100 kms. at 175·97 k.p.h.; (7) (Speed), 500 kms. at 134·514 k.p.h.

Seville-Buenos Aires Airship Service

It appears that the Spanish scheme for an airship service between Seville and Buenos Aires, which was first launched in 1920, is to be proceeded with immediately, for the Spanish Council of State has approved the terms of a convention for this service. Col. Herrera, one of the directors of the Colon Compania Transaerea, which will operate the service, stated that they hoped to commence flights in 1927. The first airships would not be built in Spain, but would be hired, and the company had received two offers of rigid airships—one from a British firm and one from a German firm. According to Colonel Herrera, "the British offer is of an airship, at present well advanced in construction, with a cubic capacity of 141,000 cu. m."

French Flight to Madagascar Completed

Lieut. Bernard, one of the two French pilots who set out from Marseilles on October 12 for Madagascar, arrived at his destination—Majunga—on November 22. He was flying a Lioré-Olivier flying-boat fitted with a French-built Bristol "Jupiter" engine. His companion, Lieut. Guilbaud, as reported last week, met with a slight mishap on his C.A.M.S. flying-boat at Gaya, on the Niger, and as soon as repairs have been made will proceed as far as Lake Tanganyika, where he hopes to join Lieut. Bernard on his return journey. They will then proceed home together via Lake Victoria and the valley of the Nile. Lieut. Bernard reached Lokoja on November 3, Fort Archambault on November 6, Stanleyville on November 13, Fort Johnston on November 13, and Quilimane on November 19. We hope to give further details of this flight in a subsequent issue of Flight.

The "Moths'" Eastern Tour

Capt. T. N. Stack and Mr. B. S. Leete, who are flying in two D.H. "Moth" light 'planes towards India, after being held up by bad weather, reached Le Bourget on November 19, and arrived at Lyons on November 21.

The Paris Aero Show and Imperial Airways

During the Paris Aero Show, to be held between December 3 and 19, Imperial Airways, Ltd., have decided to issue special rebate tickets to Paris at £8 return, to members of the Air Ministry, the aircraft industry, and serving officers of the Royal Air Force. There is a daily service to Paris which leaves Croydon Aerodrome at 12, arriving at Le Bourget Aerodrome at approximately 2.30 p.m. Cars in connection with this service leave "Airways House," Charles Street, Lower Regent Street, S.W. 1, at 11. Seats must be booked in advance, and application in writing should be made direct to the company at Croydon aerodrome.

Commander Boothby Promoted

Commander F. L. M. Boothby has, as from November 13, been promoted to Captain, R.N., retired. Commander Boothby's name is well known to readers of Flight in connection with airships, and the development of this side of aeronautics owes much to his enthusiastic energies. He was a member of the crew of H.M. Naval Airship No. 1 in 1910, and subsequently he commanded the airship stations at Barrow, Howden, and Pulham. Of late he has done much to further the revival of airships in this country.

Royal Air Force Display, 1927

Next year's Royal Air Force Display, the eighth, will take place on July 2, 1927.

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DOMINION PREMIERS AT CARDINGTON

Wednesday, November 17, was a drizzly and windy day, and the members of the Imperial Conference who visited the Royal Airship Works, at Cardington, had once again to endure some of the worst rigours of the climate of Great Britain. Three Prime Ministers (Mr. Bruce, of Australia; Mr. Coates, of New Zealand; and Mr. Mackenzie King of Canada), were present in person, and there were also representatives of South Africa, India, and Newfoundland. The weather was not merely uncomfortable; it interfered with the programme. It had been intended to show R. 33 moored to the new mast, and temporary gear to take the old-fashioned "dew-drop" of our one serviceable rigid had been attached to the mast head. But the wind in the morning was so strong that it was not possible to bring the ship out of the shed. This, however, provided a useful object lesson in the value of mooring masts for airships, for once out of the shed, R 33 would have been quite safe at the mast head.

In the afternoon the wind abated somewhat, and Major G. H. Scott took R. 33 up for a flight, intending to drop two Grebes, which were fastened underneath. Squadron-Leader Baker and Flying Officer Mackenzie-Richards went up in the ship, ready to take the Grebes off. But at 700 ft., R. 33 was lost to sight in the clouds, from which she occasionally emerged, looking like a wraith. Though the pilots declare that they can practically fly away from the ship from the very instant of release, still 700 ft. does not give much margin for error, and the Premiers all declaring for "Safety First," the dropping of the aeroplanes was cancelled.

But though the display had thus to be curtailed, the visit was full of interest. The party were able to inspect the new shed, the mooring mast, and the experimental duplicate bay of R. 101, any one of which would have well justified a visit to Cardington. The mast was inspected first. Though it is 201 ft. high, it does not look its height, partly because, standing as it does out on a plain, there is nothing near to give a scale to the eye, and partly because of the width of its base, which has a diameter of 70 ft. It is a steel frame structure, with a lift which holds a dozen people, running up the centre, while round the lift run is a circular staircase. When the party arrived at the foot, the lift was temporarily misbehaving itself, but Mr. Bruce is not a man to be deterred by a little thing like that, and he promptly set out to walk up the stairway, followed by a party of steady-headed stalwarts.

From the lift one disembarks on to a closed-in platform, from which a short stair leads to the embarking platform. This is open, and gives a fine view, with the Chiltern Hills away to the south. The gangway and steps will conform to the motion of the ship as she rides at the mast, but swaying at this point will always be very slight, and it will be no more difficult to enter the gangway than it is to embark on a tube escalator.

Above the embarking platform is the chamber which houses the mechanism of the massive moving arm. Very careful design work has evidently been expended upon this arm, though the actual mechanism appears to be simple and straightforward. The arm itself is a mighty mass of metal weighing 45 tons, and when it is locked solid with the mast, the two will withstand a pull of 30 tons in any direction. When a ship is mooring, the arm will be free to swing through an angle of 30° from the vertical. The operation of mooring commences with one cable being dropped from the nose of the ship and another from the head of the mast. The ends will be coupled on the ground, and then the main winch at the foot of the mast takes in the slack. The ship is manœuvred until its nose is 600 ft. above the masthead, and then two side guys are dropped from the nose of the mast. These are secured to anchor blocks on the ground, of which there are 24, situated in a circle 750 ft. distant from the mast, so as to provide for any direction of wind. These guys are controlled by two more winches at the foot of the mast, but in future masts it will be possible to control both by one winch. All three winches can be operated by remote controls on the embarking platform under the direction of the mooring officer at the masthead. The ship passes through three stages between complete freedom and complete captivity, all provided by the mechanism of the moving arm. When the cone on the nose of the ship has engaged the receiving cup on the arm, the arm is locked in a vertical position, but the receiving cup remains free to rotate horizontally, while the airship cone is carried on a universal joint, and the ship thus has freedom of motion in all directions. The mooring wire is then replaced by a slipping pennant. When about to "sail," the locking pins of the receiving cup are first withdrawn, and the pennant is then slipped.

At the foot of the mast, in addition to the machinery house, there is an underground tank which will hold 10,000 gallons of fuel, with a pump capable of raising 2,000 gallons an hour. There are also two pumps for pumping ballast water up at the rate of 5,000 gallons an hour. A 12-in. gas main also runs up the mast. A similar mast has been erected at Ismailia, and another is about to be erected at Karachi.

From the mast, the party turned to the shed. Again it was difficult to gauge its size by the eye, but when one got inside and saw how small a space inside was taken up by R.33, one began to get some idea of its vastness. At Pulham R.33 looks a right big airship, and one almost forgives the popular papers which habitually describe her as a "mammoth." But at Cardington she looks very small beer. A diagram showed that Bush House could be tucked comfortably away inside this shed. Yet the shed at Karachi is to be even larger. The dimensions are: Cardington—length, 812 ft.; height, 157 ft.; width, 180 ft. Karachi—length, 850 ft.; height, 170 ft.; width, 180 ft.

At one end of the shed the duplicate central bay of R.101 reared itself almost to the roof. R.33, with her cars, could fly right through the centre of this bay. The bay was constructed to afford practice in assembling, and also experiments in resisting static stresses. The bay has been clamped to the end of the shed, all supports removed, and a gas-bag has been inflated inside it. The tests have now been completed, and the bay will be dismantled. Some sections will then be tested to destruction. Not much may be said about the methods of construction, which have departed entirely from Zeppelin practice. Stainless steel is largely used for the girders, as it is lighter, strength for strength, than duralumin, but certain intermediate members are made of the latter metal. Both metals are treated so as to resist corrosion. The stainless steel is sand-blasted and covered with grey lacquer, or else zinc-plated. The duralumin is treated by a process known as the "anodic" process which has been developed at the R.A.E., Farnborough. The diameter of this bay, which is the largest, is 131 ft. 7 in. The overall height of the ship will be about 140 ft., and the length 730 ft.

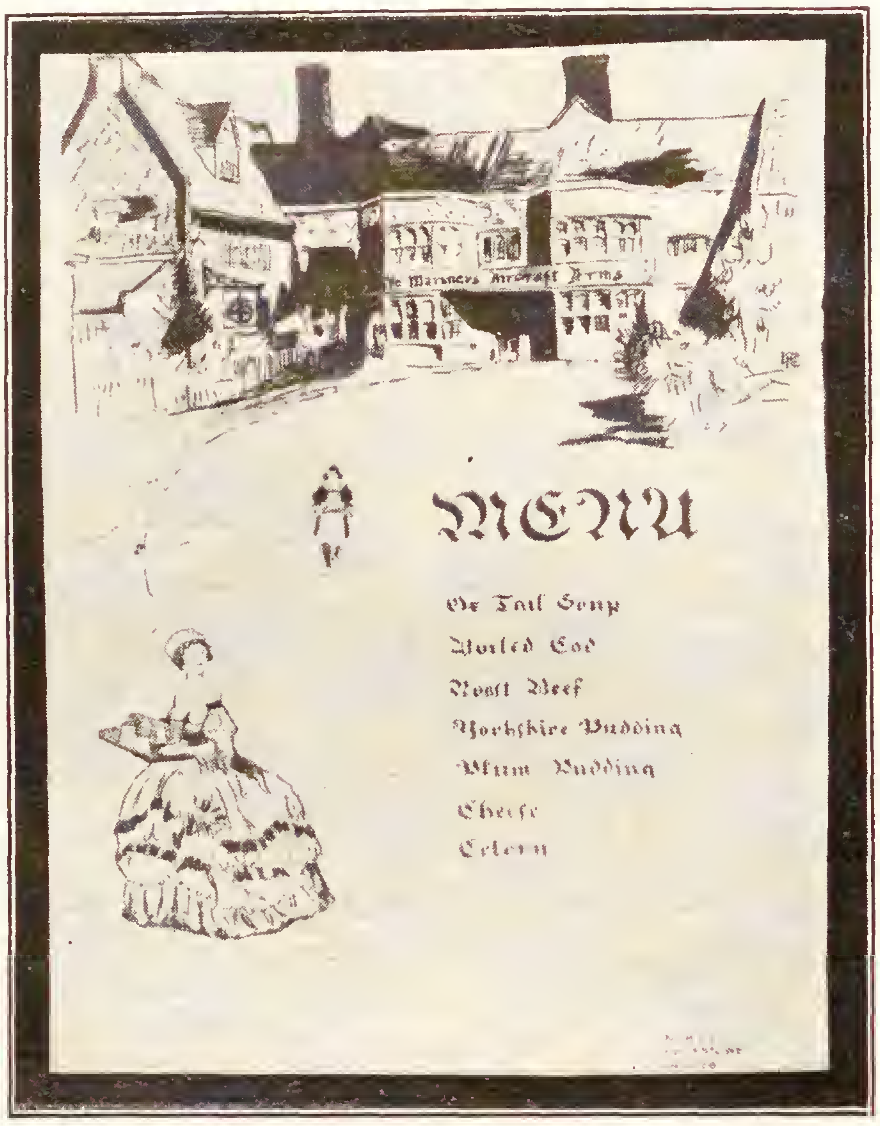
This first ship does not aim at the ultimate ideal in every direction. Some desiderata have had to be postponed for further research. One such matter is the provision of a substitute for goldbeater's skin in the gas bags. It would not be worth while to hold up the ship pending the result of the research now in progress. High commercial performance has likewise not been placed in the forefront of the programme. That can be dealt with later. But all energies have been concentrated on safety and on the comfort of passengers. The great thing is to prove the principle, to get the airship recognised by the commercial world as a useful and desirable vehicle of travel. The arrangements for the comfort of passengers are quite surprising in their elaboration. The whole of the quarters will be situated inside the hull, at the bottom of the central part of the frame. The control car will project below. Provision is being made for 100 passengers. The quarters will be arranged in two storeys. On the upper deck will be the lounge, the dining-room (to seat 50 at a time), and the main part of the sleeping accommodation. Promenades will run along each side, to give an opportunity for walking exercise, while it will be quite possible to hold dances in the lounge. Wireless, bridge, and perhaps a kinematograph will all help to dispel boredom. On the lower deck will be the smoking-room, the rest of the sleeping cabins, the kitchens, and the crew's quarters. Water will be condensed during flight and shower baths will be provided, the condensation balancing the fuel consumption.

Manufacture of the parts by Messrs. Boulton and Paul, Ltd., will begin at once, and the actual assembling of the airship is expected to take only a few months. It is hoped that she will be ready for trial flights early in 1928, or perhaps a little earlier. Perhaps by then some of the Dominions will have erected standard mooring masts, and, after the trial flights to India both R.100 and R.101 will probably visit such Dominions as possess masts. Once airships have been established in principle their future looks bright. In this connection it is useful to recall the words of Sir Alan Anderson of the Orient line at the Air Conference in 1923. He said "Prove . . . that these ships will do, not all that is asked of them, but half of what is asked of them, that they are reasonably safe and reasonably regular, and I believe you will have any number of people wanting to travel as well as wanting to run them."

F. A. de V. R.

FELIXSTOWE CONSTRUCTORS' DINNER

FROM the enthusiasm displayed at the first Annual Constructors' Dinner, arranged by Wing Commander R. B. Maycock, O.B.E., and the officers, Royal Air Force, Felixstowe, last week, there can be little doubt that the first gathering is not likely to be the last, and that the second and followers are more likely to outgrow the capacity of Felixstowe Messroom. Originality was the order of the day in several directions, although possibly *some* of the ragging during the evening was a repetition and elaboration of past customs and experiences. The Messroom was cleverly arranged in the guise of an old English Tavern, even down to the sawdust "sanded" floor, the menu being in keeping, and the guests found set out round the board a "double-headed" table planned in the form of a dumb-bell, with an ominous array of tankards, besides old English wine glasses, which gave a hint of what was later expected of those partaking of the generous hospitality of the station. There was the roast beef of old England, home-brewed ale, and what not, besides the wines of France and Portugal, and as a finishing touch with the latter, following honour to the King, a batch of real churchwarden pipes and tobacco jars amply filled—were quietly placed alongside guests and hosts. "Carving hosts" were distributed at intervals round the table, each with his quota of "guests," and so the old-style idea was further exemplified. During the dinner music, appropriate and in keeping (and otherwise) to the idea of the ancient hostelry, discoursed by an entirely voluntary R.A.F. band, tried ineffectually to drown the heartily expressed enjoyment of all those present. But with the entrance with the coffee of the pipers, who circled the dining room several times, even the most stentorious of talkers had to cry a temporary halt. Irrespective of the exhilarating effect, this little interlude more than served its purpose during the evening by giving opportunity for humorous reference to several speakers who voiced their appreciation of this ancient instrument in varying degrees. During the dinner itself an unbroken running fire of hilarious fun was the order of the "day," the spontaneous effect of a camaraderie which was delightful to witness. With the hosts, from the C.O. downwards, there was but one thought, the enjoyment of their guests. Possibly the only inhospitable action was the insistence upon the poor press representatives taking their turn in a round robin of 5-minute speeches.



MENU

Ox Tail Soup
Boiled Cod
Roast Beef
Yorkshire Pudding
Plum Pudding
Cheese
Celery

THE FELIXSTOWE CONSTRUCTORS' DINNER: The Menu Card

C.O. Wing Commander R. B. Maycock opened the after-dinner proceedings by giving a hearty welcome for the first time in their own "Home" to all their old friends. It was the first occasion, he said, the unit had launched out in a gathering of this sort—possibly because at Felixstowe they had hitherto felt a little out of the limelight, but now, through the advent of the seaplane, they had come right into the picture, which he thought would justify this departure.

Mr. Cowlin, in supporting the C.O. in the toast of "The Guests," said he hoped the precedent set by that meeting might be continued annually for years and years, the toast being received with musical honours.

Mr. Fairey, in opening the responses, expressed on behalf of the guests their appreciation and gratitude for all that Felixstowe Air Station was doing for aviation in general, and the constructors. The constructors were a very much misunderstood class. As a fact, they were all working for the benefit of aviation and its future without a tinge of jealousy between each other. After the war they had all had a disastrous and strenuous time to keep going at all, but most of those who were real constructors had by one means or another managed to exist by taking on temporarily any odd job that might fill the gap for keeping their works going until better times and appreciation of aviation came along—which reminded him of an inquiry as to what one firm was filling up with, and when told they were making coffins, the further query was "what engine are they putting in?"

Mr. Handley Page humorously filled up his five minutes, and seriously considered that aviation had now entered into the ordinary uses of life.

Following Mr. Oswald Short, Commander Bird proposed the toast of "The President and Officers of R.A.F., Felixstowe Station," which was, needless to say, musically honoured, and amongst others who more or less respected their respective 5 minutes' speech limit were Major Buchanan, Mr. Parnall, Mr. Robert Blackburn, Mr. Nicholson, Mr. Folland, Mr. J. Lord, Mr. Winter and Mr. Frank Courtney.

An adjournment was then made to the anterooms, where further pleasantries were indulged in, whilst, appropriate to the old-time atmosphere of the evening, steaming bowls of punch appeared upon the scene about midnight.

Altogether, Mr. President, Vice-President and gentlemen, a grand evening.

Guests and hosts present included Sqdn.-Ldr. Woodhouse, Sqdn.-Ldr. M. Wright, Sqdn.-Ldr. Rea, Sqdn.-Ldr. Slatter, Flight-Lieuts. Sawyer, Gray, Staton, Massey, Wilkinson, Comper, Chick, Hunter, Hackney, Hatcher, Brook, Courtney, Cross, Flying Officers Stocken, Wardle, Usher, Stafford, Goadsby, Clemens, Dipple, Martin, Ballantyne, Worsley, Soper, Horwood, P. O. Amy.

Commander J. Bird, Major J. S. Buchanan, Major Bumpus, Capt. Norman McMillan, Capt. C. E. Nightingale, Capt. Bennett Baggs, Capt. C. W. Lamb, Messrs. A. J. A. Wallace Barr, H. Biard, R. Blackburn, H. Bolas, L. P. Coombes, F. E. Cowlin, C. R. Fairey, H. P. Folland, C. G. Grey, W. L. Jackson, W. Lanachberry, W. Lappin, John Lord, R. J. Mitchell, W. Nickolson, C. E. R. Osman, F. Handley Page, W. L. Parker, George Parnall, J. D. Rennie, Oswald Short, Stanley Spooner, G. G. H. Winter.

◆ ◆ ◆ ◆

No. 3 Squadron, R.F.C., and No. 3 (Fighter) Squadron, R.A.F., Annual Reunion Dinner

THE third reunion dinner of the above will be held at the Trocadero on Wednesday, December 1 next, at 7.45 p.m. for 8 p.m. Air Marshal Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., A.D.C., in the chair. Tickets 12*s.* 6*d.*, obtainable at the dinner.

Royal Air Force Flying Accident

THE Air Ministry regrets to announce that as the result of an accident at Kenley, Surrey, to a D.H.9A., of No. 24 Squadron, Kenley, on November 22, Flight-Lieut. Felix St. John Woollard, A.F.C., the pilot of the aircraft, was killed, and Flying Officer Frederic Laing Collison was seriously injured and died shortly afterwards.

R. M. KINDERMAN
COLLECTION

THE ROYAL AIR FORCE

London Gazette, November 19, 1926.

General Duties Branch

The follg. are granted permanent commissions in the ranks stated (Nov. 1)—Flight Lt.—F. H. Shales. Flying Officer.—H. N. Thornton.

Pilot Officer J. H. Barringer is promoted to rank of Flying Officer (Oct. 14).

The follg. Flying Officers are transferred to the Reserve :—Class A.—W. G. Nicholls (Nov. 18) ; Class C.—N. H. F. Unwin (Nov. 13).

Flying Officer S. T. Littleton resigns his permanent commission (Nov. 17). The follg. resign their short service commissions (Nov. 17) :—Pilot Officer J. T. C. Skellon, Pilot Officer on probation L. S. S. Tunks. The short service commn. of Pilot Officer on probation A. E. Scott Moore is terminated on cessation of duty (Nov. 17) ; G. H. Morris, Lt., R.M., Flying Officer, R.A.F., relinquishes his temp. commn. on return to duty with Royal Marines (Nov. 10) ; Flying Officer R. L. Yates (Lt., Royal Scots Fus.) relinquishes his temp. commn. on return to Army duty (Oct. 26).

Stores Branch

Flying Officer on probation O. G. Ridley, M.C. (Maj., R.A.R.O.), is confirmed in rank (Oct. 6).

Accountant Branch

Flying Officer B. E. Hume Wright is transferred to Reserve, Class C (Nov. 15).

Medical Branch

Flying Officer W. A. Beck, M.B., D.P.H., is transferred to the Reserve, Class D.2 (Nov. 19).

Memorandum

R. W. Stevens is granted a temp. commn. as a Flight Lt. (Legal Officer) (Nov. 11).

Reserve of Air Force Officers

The following Pilot Officers are promoted to rank of Flying Officer :—R. N. Bullock (June 17) ; A. R. J. Savage (Sept. 24) ; John Gallacher (Oct. 3). Pilot Officer on probation F. R. Matthews is confirmed in rank (Nov. 9). The following Flying Officers are transferred from Class A to Class C :—H. MacMillan (Nov. 12) ; A. D. Drysdale (Nov. 13). Flying Officer F. R. Steggall, D.C.M., relinquishes his commission on completion of service (Oct. 24).

AUXILIARY AIR FORCE

General Duties Branch

The following to be Pilot Officer :—No. 600 City of London (Bombing) Squadron.—G. de H. Vaizey (Nov. 16).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Squadron Leader K. C. Buss, to H.Q., Irak, 12.11.26.

Flying Officers : W. E. Purdin, to No. 1 Flying Training School, Netheravon ; 22.11.26. F. L. Collison, to No. 39 Sqdn., Spittlegate ; 17.11.26.

Medical Branch

Flight Lieutenants : C. P. Barber, to Basrah Combined Hospital, Iraq ; 18.10.26. T. V. O'Brien, M.B., to Station Commandant, Hinaidi ; 16.10.26. G. P. O'Connell, M.B., to H.Q., India ; 17.10.26.

Flying Officers : G. J. Griffiths, to Basrah Combined Hospital, Iraq, 14.10.26. D. B. Smith, M.B., and F. B. C. L. B. Crawford, M.B., to R.A.F., British Hospital, Iraq ; 16.10.26. J. McM. Wilder and R. J. K. Chattey, to Station Commandant, Hinaidi ; 16.10.26. B. L. Edwards, M.B. and E. A. Aslett, to Station Commandant, Basrah ; 14.10.26.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty :—

Lieuts. (*Flying Officers, R.A.F.*).—A. Brock and G. R. F. T. Cooper, to *Furious*, and for full flying duties in 420 flight (Sept. 18 and Oct. 18 respectively).

Promotion

Commander (retd.) F. L. M. Boothby, C.B.E., to rank of Capt. (rtd.) (seny. Nov. 13).

IN PARLIAMENT

Civil Aviation Subsidies

Sir H. Brittain, on November 15, asked the Secretary of State for Air the annual amounts of subsidy for civil flying granted by Great Britain, France and Germany respectively ; and whether every effort is being made by His Majesty's Government to give at least similar support to the development of our civil air service as is the case in the other two countries referred to ?

Sir Samuel Hoare : As regards the first part of the question, the total sum allocated to the development of civil aviation in Air Votes for the current year is £462,000. In addition, £362,000 is being expended on airship development, which is, to a large extent, for civil aviation purposes. It is difficult to give exactly comparable figures in respect of France and Germany, but the following are approximate : France, 78,175,000 francs ; Germany, 24,661,500 Reichmarks.

Actual subsidy payments to civil air transport companies are as follow : Great Britain, £167,000 ; France, 59,500,000 francs ; Germany, 8,371,500 Reichmarks.

As regards the second part of the question, the policy of His Majesty's Government is to spare no effort to place the operation of civil air transport on a commercial footing as early as possible.

Captain P. Macdonald : Is it not a fact that the large subsidy paid by the German Government for civil aviation enables Germany to control and operate 75 per cent. of the civil air lines in Europe ?

Sir S. Hoare : I do not think that arises out of the question. I should like to have notice of the question. I do not know whether the percentage given is accurate or not.

Karachi Airship Base

Mr. Scurr asked the Under-Secretary of State for India what progress has been made with the work on the airship base at Karachi ; and when it is expected that the work on this airship base will be finished ?

The Under-Secretary of State for Air (Sir Philip Sassoon) : I have been asked to reply. In answer to the first part of the question, considerable progress has been made with the work. The site has been cleared, the foundations of the shed have been laid and part of the steel work erected, and many of the ancillary works services have been completed. As regards the second part of the question, all the work now in hand should be completed in the latter part of 1927.

Bagdad Aeroplane Accident

Colonel Day, on November 19, asked the Secretary of State for Air if he is yet in a position to state the result of the inquiry into the disaster to the biplane troop-carrier at Bagdad on July 26 last, which resulted in the death of seven airmen ?

Sir S. Hoare : Inquiry has shown that the cause of the accident was the breaking of the starboard engine crankshaft just after the aeroplane had taken off and was at a height of 100 ft. above the aerodrome. The reason why the pilot did not throttle back the port engine, which would have enabled the aeroplane to glide straight on, was apparently that he hoped to be able to reach some open ground on the right and to avoid obstructions immediately in his front.

Royal Air Force Accidents

Colonel Gretton, on November 22, asked the Secretary of State for Air how many fatal accidents there have been in the Air Force this year and how many lives have been lost ; what were the corresponding losses last year ; the numbers of machines destroyed by accidents this year and last year ; can he attribute the crashes of flying machines and loss of life in the Air Service to any general cause ; and what steps he is taking to reduce the number of accidents ?

Sir S. Hoare : The figures requested in the first three parts of the question for the period January 1 to November 18, 1926, and for the corresponding period in 1925, are as follows :—

	1926.	1925.
Fatal accidents	49	36
Deaths	78	50
Aircraft reported by November 18 as written off charge as a result of crashes	230	212

Of the deaths in 1926, 15 have occurred in three accidents, two of which may be regarded as of an exceptional character. I should add that the amount of flying in 1926 to date is materially in excess of that for the corresponding period of 1925. The figures relate to Royal Air Force personnel only, and do not include aircraft written off charge as a result of enemy action. As regards the fourth part, in spite of continuous and careful scrutiny of every individual accident, no general cause can be assigned. Many accidents are the result of a combination of causes. A mechanical failure, containing no element of danger itself, but necessitating a forced landing, may be followed by a crash due to bad ground, or an error of judgment. A slight error of judgment in the air, especially near the ground, may have fatal results, whereas a similar error of judgment on the ground, as when driving a motor-car, probably results only in minor material damage. As regards the last part, the steps which are being taken are continuous. All sides of this question are carefully watched, *e.g.*, the number of accidents, the stations at which they occur, the time of the year, the nature of the country, the type of machine, the medical and flying history of the pilot, methods of training, etc., etc. Every serious accident is investigated by an independent inspector reporting to the Secretary of State, as well as by a local court of inquiry. Endeavours are also being made to evolve more controllable machines, and mechanical devices designed to increase the safety of flying. Parachutes have been generally introduced and have saved several lives this year. It must also be remembered that aircraft are constantly and necessarily improving in performance, and every addition to speed and power tends to make the result of an accident more serious. My right hon. and gallant friend may rest assured that this question is engaging my constant personal attention, and that every possible precaution is and will continue to be taken with a view to safeguarding the lives of our flying personnel by all means in our power.

An Imperial Airways Change

Will readers please note that from November 27 the London office of the Imperial Airways, Ltd., will be removed from Wolseley House, Piccadilly, to Airways House, Charles Street, Lower Regent Street, S.W.1 (Telephone, Regent 7861—7865). The Piccadilly office will be closed after this date, and, beginning on Wednesday, December 1, the departure station for passengers will be Airways House, and *not* Hotel Victoria, as hitherto. On the inwards journey, the cars conveying passengers from Croydon Aerodrome to Airways House will, when required, also call at Hotel Victoria.

Air Bombs in Brazil

A revolution broke out last week in the Brazilian State of Rio Grande do Sul, and the town of Santa Maria was bombed by revolutionary aeroplanes, a large hotel and a bank being destroyed.

PERSONALS

Married

On October 23, at the Cathedral, Bombay, Flight-Lieut. CHRISTOPHER N. H. BILNEY, R.A.F., second son of Mr. and Mrs. Bilney, Newbury, Berks, was married to NELLIE G. PERREN, elder daughter of the late Mr. T. Perren and Mrs. Perren, Box, Wilts.

Flight-Lieut. HERBERT BAINBRIGGE RUSSELL, A.F.C., only surviving son of the late Herbert Russell and Mrs. Russell, of 24, Argyll Mansions, was married on October 30, at St. Garmon's Church, Capel Garmon, to MARGARET ANN, youngest daughter of Mr. and Mrs. GEORGE BOVILL, of Rhydyereua, Bettws-y-Coed.

FLIGHT-LIEUT. C. G. WIGGLESWORTH, A.F.C., second son of George Wigglesworth, of Brighton, was married on October 23, at Holy Trinity, Brompton Road, to MARGARET CADE, younger daughter of the late Arthur Cade and Mrs. Bemrose, of 26, Oakwood Court, Kensington.

To be Married

The engagement is announced between FRANCIS F. INGLIS, R.A.F., eldest surviving son of the late Mr. Alfred Inglis and of Mrs. Alfred Inglis, of the Hollies, Bickley, and VERA, second daughter of Mr. and Mrs. CECIL W. TURNER, of 49, Cleveland Square, W.2.

An engagement is announced between Capt WALTER HENRY PARK, M.C., D.F.C., R.A.F., second son of the Rev. James Park, of Park Still, Broughton-in-Furness, and Miss EDITH MARY HIRST, younger daughter of Mr. and Mrs. Hirst, of Rylstone, Broughton-in-Furness.

A marriage has been arranged, and will take place quietly in London, between DONALD SALISBURY GREEN, R.A.F., eldest son of Mr. and Mrs. Owen Green, of Harpenden, and NANCY WHITER, daughter of Mr. and Mrs. MACALISTER, of Worthing and St. Albans.

⁂

SOCIETY OF MODEL AERONAUTICAL ENGINEERS (S.M.A.E.)

THE Society's flying programme for this year having now come to an end, a list of the standing records to date is given below. It is of interest to note that during the season no less than four records have been raised and two new ones established (the former are marked " r " and the latter " n " in the list).

British Model Aeroplane Records (November, 1926).

Model.	Type Formula of Model.	Holder of Record.	Duration in Seconds.	
Fuselage Models.				
Fuselage Glider (H.L.) ..	O–I–I	R. N. Bullock	$51\frac{1}{5}$	*r*
Fuselage Flying Model (R.O.G.) (Rubber Driven)	P–O–I–I	W. J. Plater	$45\frac{3}{5}$	*r*
Fuselage Flying Model (H.L.) (Rubber Driven)	P–O–I–I	W. J. Plater	50	*r*
Fuselage Flying Model (R.O.G.) (Compressed Air Driven)	P–O–I–I	D. A. Pavely	43	
Spar Models.				
Twin Pusher (R.O.G.) ..	$I–I–O–P_2$	S. C. Hersom	247	
Spar Tractor (H.L.) ..	P–O–I–I	R. N. Bullock	108	*r*
Farman Type (R.O.G.) ..	O–I–P–I	C. A. Rippon	$32\frac{2}{5}$	
Farman Type (H.L.) ..	O–I–P–I	C. A. Rippon	$37\frac{4}{5}$	
Spar Glider (H.L.)	O–I–I	C. J. Burchell	$53\frac{2}{5}$	
Seaplanes.				
Spar Tractor (R.O.W.) ..	P–O–I–I	S. C. Hersom	43	
Twin Pusher (R.O.W.) ..	$I–I–O–P_2$	S. C. Hersom	65	
Fuselage Tractor (R.O.W.)	P–O–I–I	S. C. Hersom	10	*n*
Other Types.				
Compressed Air (Non-fuselage) (R.O.G.)	P–O–I–I	D. A. Pavely	70	
Petrol Driven (R.O.G.) ..	P–O–I–I	D. Stanger ..	51	
Autogiro (H.L.)	$O–I–I–P_2$	D. A. Pavely	22	*n*

H.L. signifies hand-launched.
R.O.G. ,, rising off ground.
R.O.W. ,, rising off water.

Two well-attended meetings took place at Headquarters on October 22, and November 5. On Friday, November 19, at 7.30 p.m., Mr. D. A. Pavely read a paper on "Compressed Air Plants."

B. K. JOHNSON, *Hon. Secretary*

IMPORTS AND EXPORTS, 1925-1926

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913. see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; for 1921, see "FLIGHT" for January 19, 1922; for 1922 see "FLIGHT" for January 18, 1923; for 1923, see "FLIGHT" for January 17, 1924; for 1924, see "FLIGHT" for January 22, 1925; for 1925, see "FLIGHT" for January 21, 1926.

	Imports.		Exports.		Re-Exports.	
	1925.	1926.	1925.	1926.	1925.	1926.
	£	£	£	£	£	£
Jan. ..	3,546	494	83,728	130,049	291	—
Feb. ..	985	2,089	85,639	40,416	20	6,341
Mar. ..	—	1,001	56,881	92,840	9,355	9,758
Apl. ..	321	536	78,041	160,832	6,732	5,051
May ..	560	342	74,844	118,539	15,278	—
June ..	190	24,866	71,009	66,111	667	150
July ..	184	16,033	159,262	39,047	870	—
Aug. ..	469	21,401	113,054	146,129	—	1,035
Sept. ..	1,224	3,172	111,237	55,674	213	—
Oct. ..	460	528	114,563	41,968	855	30
	7,939	70,462	948,258	891,605	34,281	22,365

⁂

PUBLICATIONS RECEIVED

Airworthiness Handbook for Civil Aircraft. Air Publication 1208, 1926. H.M. Stationery Office, Kingsway, London, W.C.2. Price 1*s.* 3*d.* net.

The Air Pilot Monthly Supplement. No. 25. *November,* 1926. Air Ministry, Kingsway, London, W.C.2.

Catalogue

Morris Slings. Herbert Morris, Ltd., Loughborough.

⁂

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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16,300. C. M. HALL. Light metallic constructions for aircraft, etc. (260,316.)

25,921. SUPERMARINE AVIATION WORKS, LTD., and R. J. MITCHELL. Aircraft. (260,413.)

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4,173. H. E. S. HOLT. Parachute containers. (260,471.)

7,385. ARMSTRONG SIDDELEY MOTORS, LTD., and S. M. VIALE. Attachment of cylinders to crank-cases. (260,480.)

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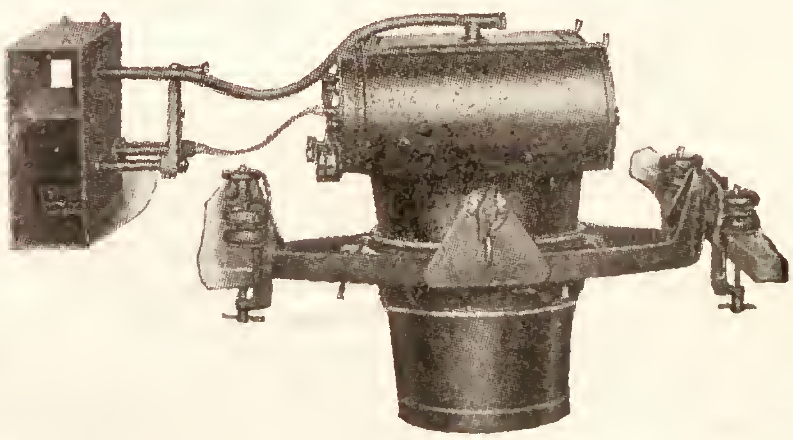

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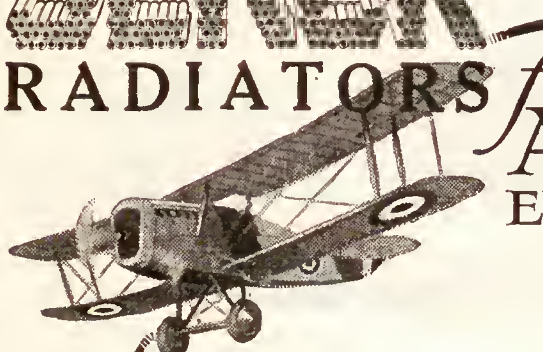

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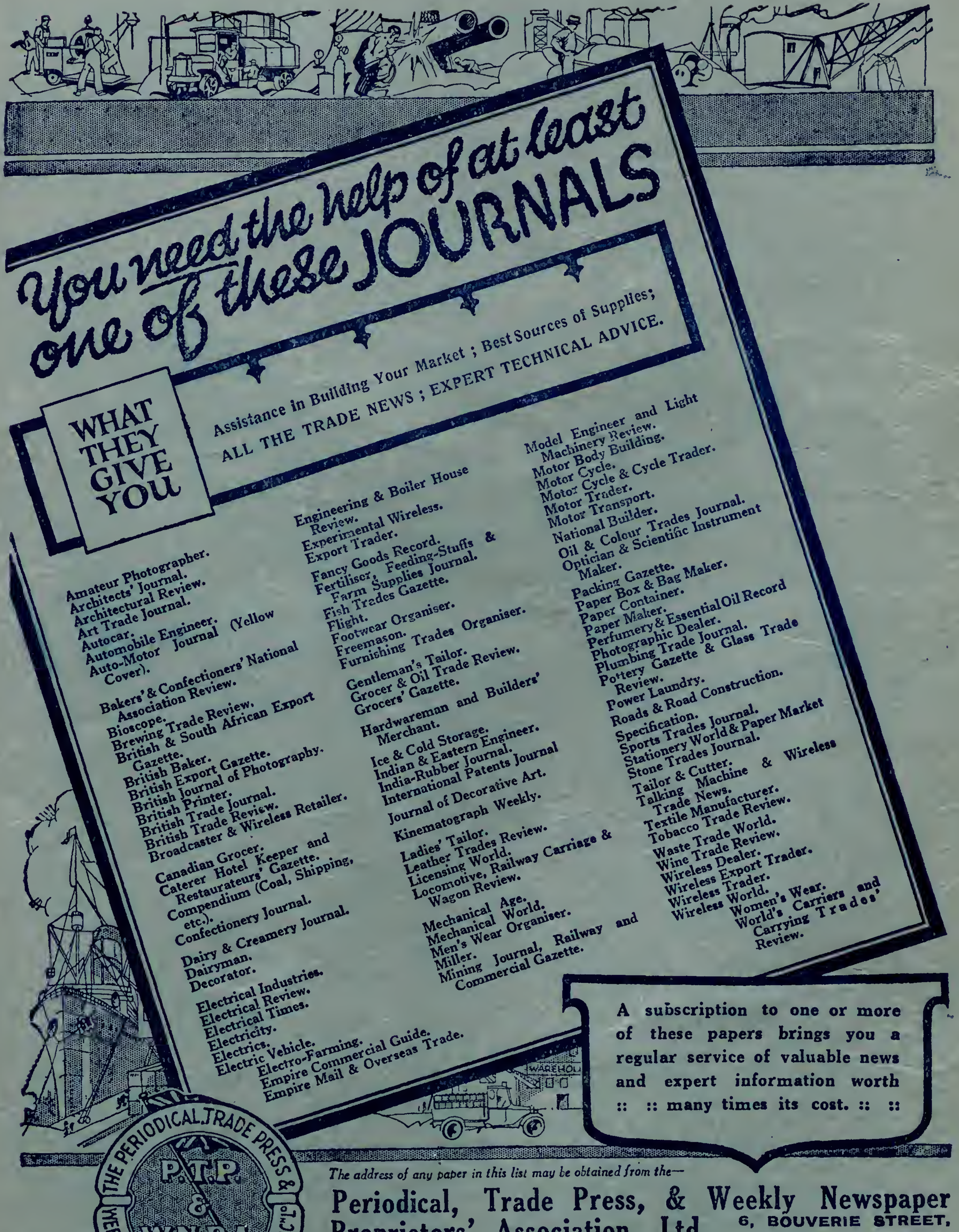

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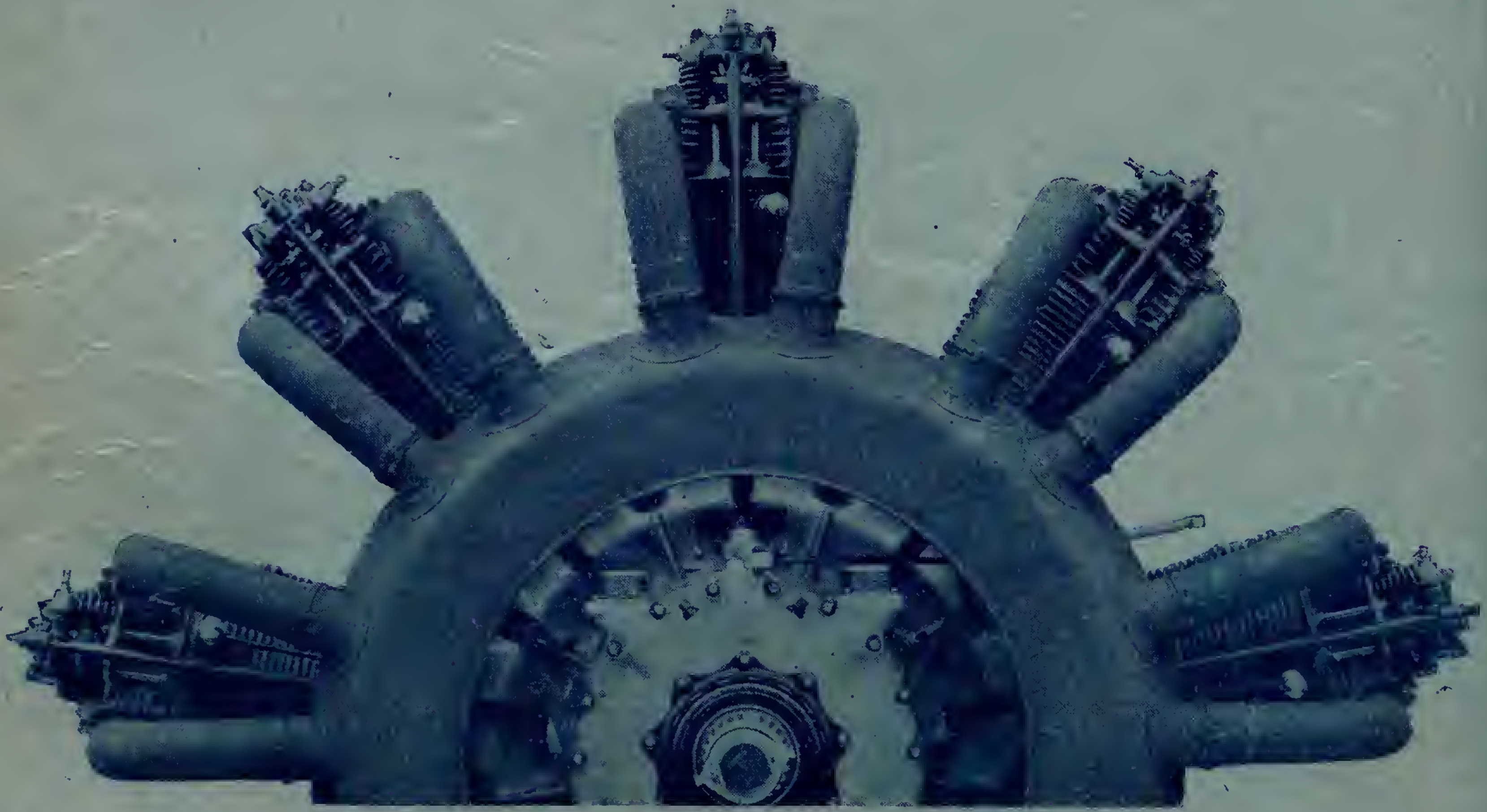

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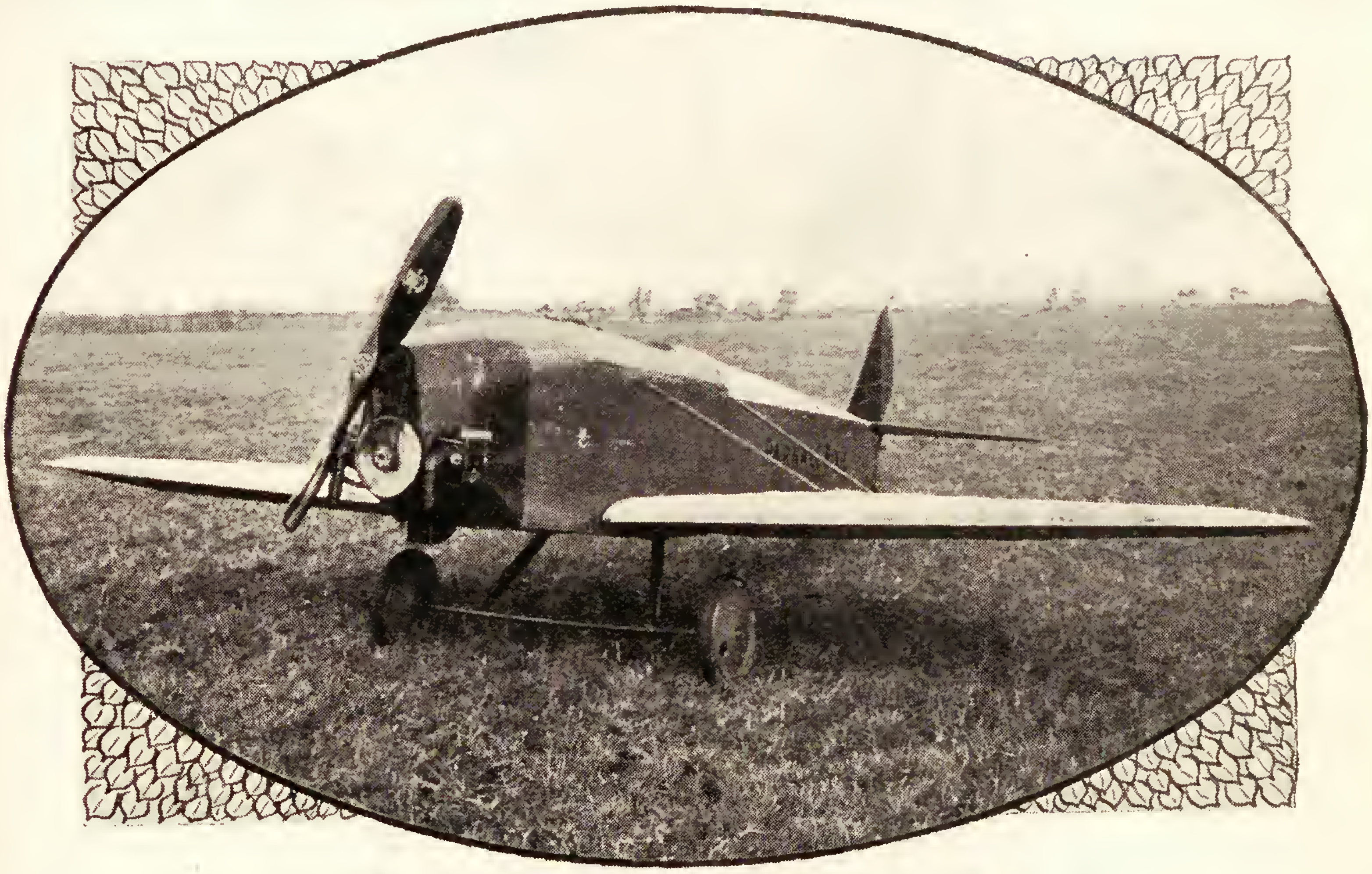

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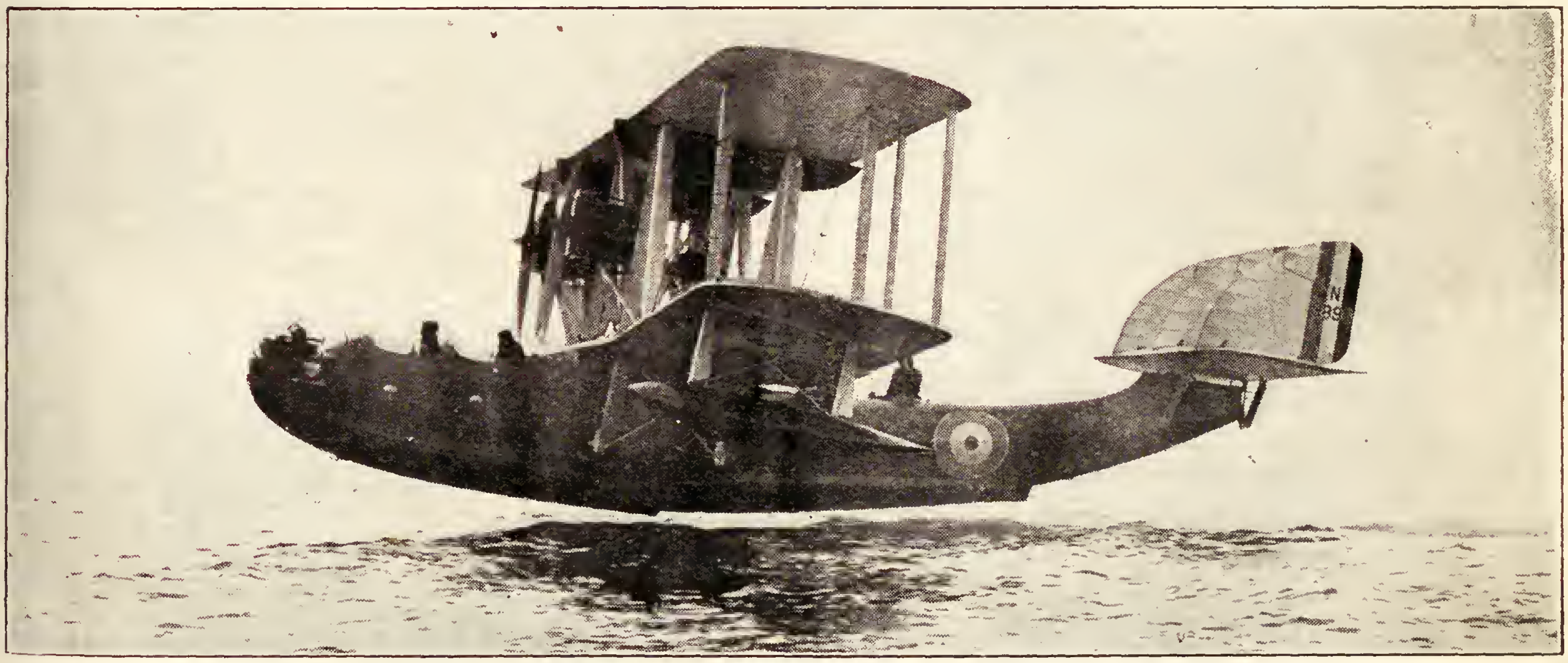

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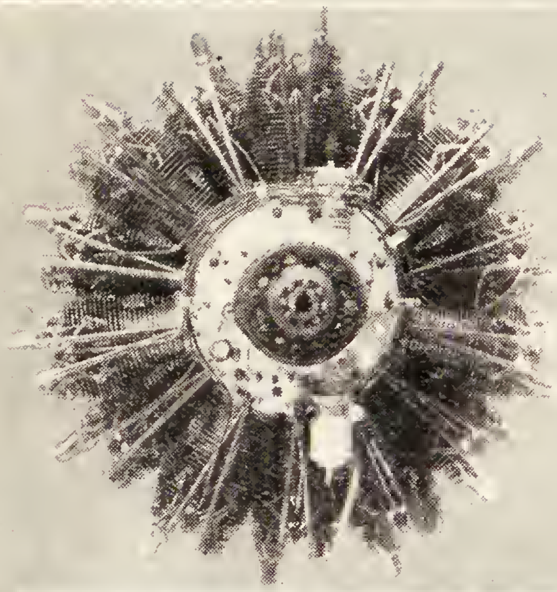

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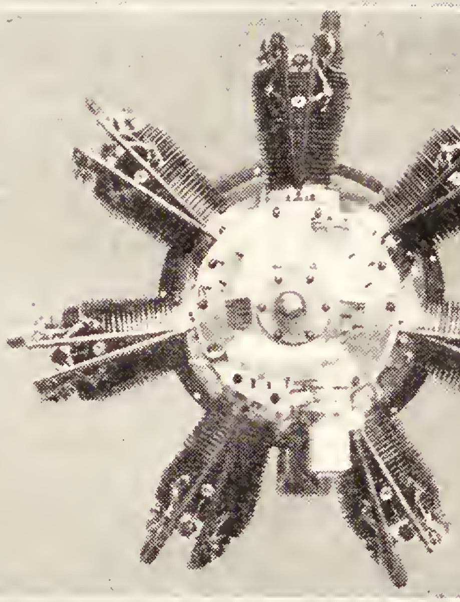

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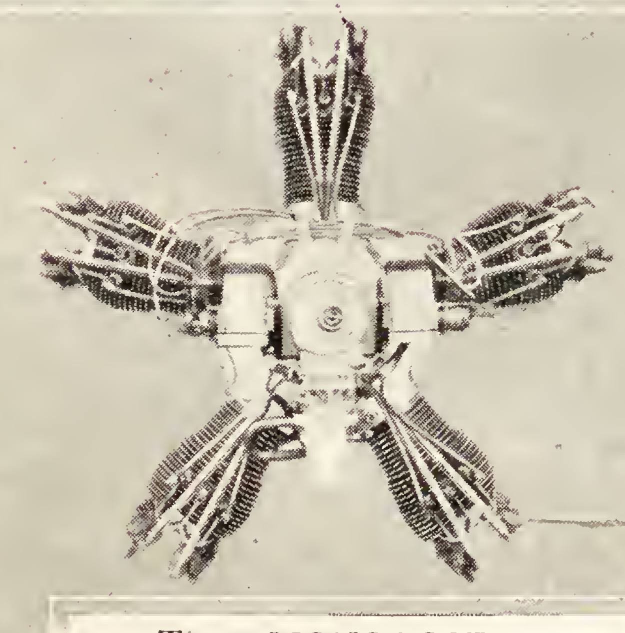

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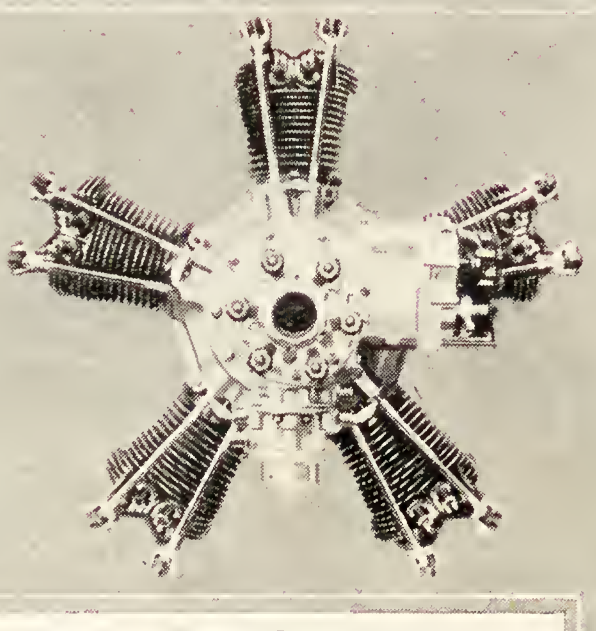

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926
Dec. 2 .... Mr. P. B. Henshaw. "Valve Steels," before R.Ae.S.
Dec. 3-19 .... Paris Aero Show
Dec. 9 .... Captain F. Entwistle, B.Sc. "Wind Structure in Relation to Air Navigation," before Inst.Ae.E.
Dec. 16 .... Wing-Comdr. C. D. Breeze, A.F.C., R.A.F. "The Training of Aircraft Apprentices," before R.Ae.S.

EDITORIAL COMMENT.

The Paris Aero Show

CERTAIN events in aviation have in the course of time attained a position of eminence which could not originally have been foreseen, which cannot now be explained on logical grounds, but which is yet generally admitted and even taken for granted. The Gordon Bennett race was one such event, in the realm of air racing. It was followed by the Coupe Deutsch. The Coupe Beaumont has never equalled these two, nor, in our opinion, will it ever do so. The seaplane race for the Schneider Cup is another such event. Beginning modestly, and donated with prizes which, although substantial at the time they were first offered, are certainly far from extravagant, this race has become *the* seaplane race of the world, and the Schneider Trophy is, perhaps, more intensely coveted than any other similar trophy. Why is it? Nobody appears to be able to supply the answer. The fact remains, however, that the nations have spent vastly more money on securing this trophy than has ever been spent on any other air race. Had the Americans won the race this year there would have been an end to the Schneider Cup race, and it is extremely doubtful if any new trophy or prize, even if of vastly greater value, would ever quite have taken the place of the Schneider Cup. Thus it is probably the very best thing that could have happened to aviation that Lieut. de Bernardi, on behalf of Italy, lifted the Cup at Norfolk, Va.

Among aero exhibitions, that in the Grand Palais, Champs Elysees, provides yet another example of an event the importance of which has grown with the years, until it is safe to say that no other aero Show in the world equals the French in importance. Again one is prompted to ask why is it? Certainly the Paris aero Shows were among the first in the world, if not indeed the very first aero Show of all was one at Paris, but this in itself does not necessarily explain why it is that the Paris Aero Show of modern times is *the* exhibition event. Yet we think there are few who will seriously deny that this is so. Is it that at the Grand

Palais such a tremendous amount of business is done? Frankly, we doubt it. A certain number of orders are doubtless booked there, but the greater part of the business of selling and buying aircraft is, we feel sure, done as an indirect rather than as a direct result of the Shows. How is it, then, that the Paris Aero Show has come to occupy such a prominent position? It is probably to be accounted for as being one of those cases of mass psychology which cannot be explained but which must be accepted. And furthermore, without a doubt the Paris Show, quite irrespective of the quality of its exhibits, does draw together representatives of all the nations in the world which are at all seriously interested in aviation in any of its phases. That, to our way of thinking, is the real value of the Paris Aero Show. One meets there all the people that matter in the aviation world; old friendships are renewed, new friends are made, and "shop" is talked in a congenial atmosphere from morning till night. If, at the same time, the machines exhibited show any real progress, any clever features, or inspire fresh lines of thought, so much the better.

If the psychological side of the Paris Aero Show is somewhat intangible, the technical is plain enough, and in the present issue of Flight we have attempted to place before our readers brief particulars of all the aircraft to be exhibited there. We fear that in this we have not, perhaps, been entirely successful inasmuch as we should hesitate to claim that the following pages contain complete data of *all* the machines which visitors to the Grand Palais will have an opportunity of seeing. We believe, however, that we can claim to have succeeded in collecting together brief specifications of something over 90 per cent. of the exhibited aircraft. In view of the difficulty of obtaining—especially in France—advance information before the opening of an aero exhibition, we feel that to have managed to extract from some 30 firms of reticent aircraft constructors data relating to their exhibition machines is by way of being a small achievement, and we trust the data, although not very exhilarating reading, will not be found to be without interest. In many cases the performance data given are those officially checked by the French *Section Technique*, and should thus be reliable.

A feature of this year's Paris Show is the number of machines which have either "made history" in some way or other by meritorious flights, or the performance of which has been verified by the S.T.A. There is scarcely a machine exhibited which has not thus proved itself, and to this extent, therefore, the 1926 Show can be said to be an improvement over previous ones. Furthermore, it can, we think, be said that there will not, this year, be a single "freak" at the Show. While this fact may detract somewhat from the gaiety of nations, it is, on the other hand, a definite proof of solid, if less spectacular, progress.

A noteworthy feature of the Show will be found to be the increasing use of metal, and more particularly Duralumin, as an aircraft construction material. This is not to say that wood has disappeared altogether, nor that it promises to do so immediately. In fact, several firms, notably among the old-established firms such as Farman and Caudron, still retain wood construction. But the number of firms having seriously turned their attention to metal is obviously increasing, much as is the case in this country.

British participation in the Paris Aero Show is very limited, the only firm to exhibit aircraft being Sir W. G. Armstrong-Whitworth Aircraft, Ltd., who are showing one of their "Ajax" two-seaters, with Armstrong-Siddeley "Jaguar" engine. Armstrong-Siddeley Motors are exhibiting a full range of aero engines: the "Genet," "Mongoose," "Lynx" and "Jaguar," of which the "Mongoose" is a new type and will be seen at Paris for the first time. The Bristol Aeroplane Company are showing their three types of engines: the "Cherub," the "Lucifer" and the "Jupiter." While on the subject of the latter engine, we would call attention to the amazing number of machines at the Show fitted with the "Jupiter." In most cases, of course, these are the "Jupiters" built under licence by the Gnome-Rhone Company, but as the country of origin of the Bristol "Jupiter," Britain may justly take a pride in the popularity of this engine, to which its extensive use bears testimony.

In this week's issue of Flight will be found a special section dealing with British aircraft firms and their products. Although it is obviously impossible to give, in 24 pages, a comprehensive review of the British aircraft industry, it is hoped that the special section will be found useful as an indication of what is being done in Great Britain. A somewhat serious handicap is imposed by the fact that British Air Ministry regulations do not permit performance figures of modern British aircraft being published, so that a direct comparison, in this respect, cannot be made with the French and other machines of which particulars are given in this issue. Generally speaking, however, it may be taken for granted that, class for class, type for type, and power for power, British machines need not fear comparison with any exhibited in the Grand Palais.

◆ ◆ ◆ ◆

Aerial Triptyques

Customs Passes, serving the same purpose as motor-car triptyques, but without the triptyques' chief disadvantage, have recently been introduced by the Royal Aero Club for the benefit of British airmen abroad and private owners of aircraft touring the Continent. With motor-car triptyques a substantial sum of money is required to be deposited as a security before the car can leave the country, but these new customs passes for aircraft, known as "carnets de passage en douanes," save the aerial tourist all this inconvenience. A "carnet," procurable from the Royal Aero Club at a cost of only £1 11*s*. 6*d*., serves as a customs pass on foreign aerodromes, and relieves the holder of all troublesome formalities, including the necessity of making a cash deposit, as has been required hitherto. The "carnet" is in the form of a paper-covered book with detachable sheets and counterfoils, and is applicable to balloons, aeroplanes, seaplanes, amphibians, and helicopters. It is officially recognised by Great Britain, Belgium, France, Italy, Holland, Roumania and Switzerland, and carries the guarantee of the Aero clubs of 25 nations. A number of British private owners and taxi-pilots, including all the pilots of Capt. Lowenstein's private air fleet, have been using these "carnets" for some time past, and one of the latest applicants was Flight-Lieut. J. S. Chick, the Harlequin Rugby footballer, who is spending his honeymoon touring the South of France with his wife in a light aeroplane.

World's Records

The Royal Aero Club has received notification of the following world's records from the Federation Aeronautique Internationale:—

Height with 1,000 *kgs. of Merchandise.*—V. Gronau (Germany) on Heinkel seaplane, 450 h.p. Napier "Lion," November 2, 1926, 4,492 m. (14,738·25 ft.).

Height with 500 *kgs. of Merchandise.*—Capt. E. L. Tornberg (Germany) on Heinkel seaplane, 450 h.p. Napier "Lion," November 10, 1926, 5,731 m. (18,803·4 ft.).

The PARIS AERO SHOW 1926

In the following pages of this week's issue of Flight *will be found particulars and illustrations of practically all the aircraft to be exhibited at the Paris Aero Show which opens at the Grand Palais, Champs Elysees, to-morrow, December* 3. *This advance report deals, in so far as it has been possible to obtain the necessary material, mainly with the general characteristics of the machines exhibited, the purpose for which they were designed, the engines with which they are fitted, the main dimensions of the machines, and their performances. No attempt has been made to give very detailed descriptions of constructional features, as it is intended to return to these in subsequent issues. In the meantime the following notes and illustrations should serve as a very useful guide to those visiting the Paris Aero Show, as well as giving a fairly complete indication to those not able to visit the Salon of the general trend of European aircraft development as represented by the machines on view in the Grand Palais.*

ARMSTRONG-WHITWORTH

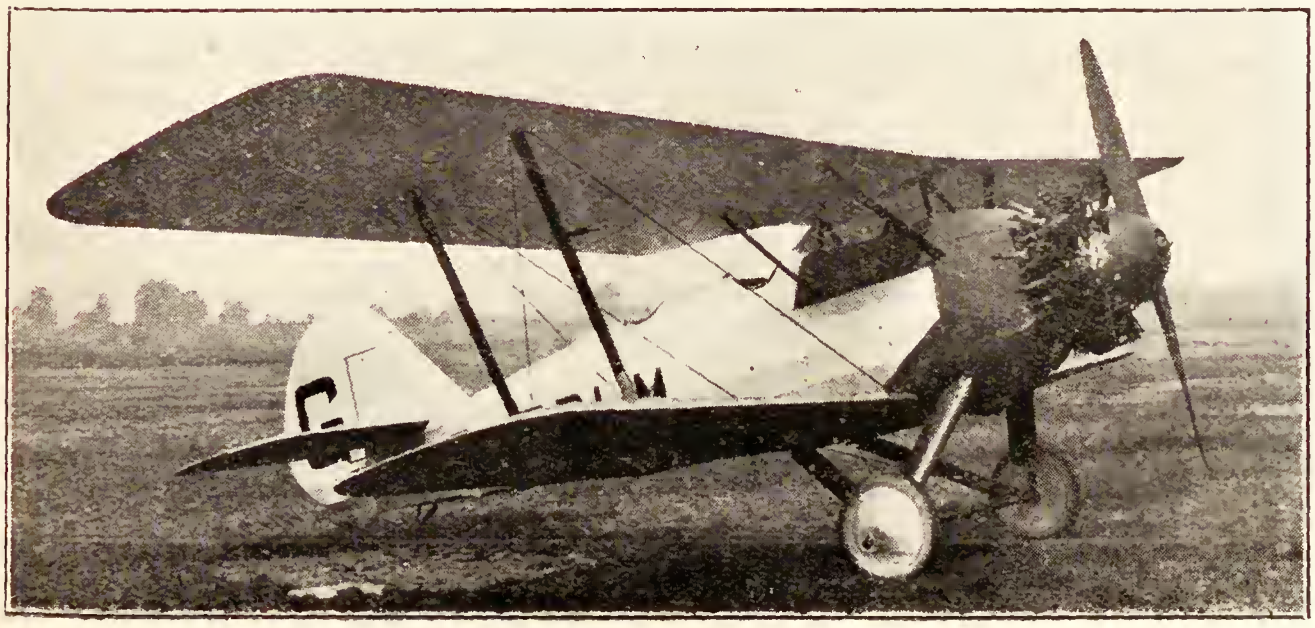
The British firm of Armstrong-Whitworth is so well known throughout the world that there is no necessity here to mention its various products. *Sir W. G. Armstrong-Whitworth Aircraft, Ltd*, is a branch of the parent company and devotes its energies exclusively to aircraft construction, while its allied company, *Armstrong-Siddeley Motors, Ltd.*, produces the famous aero engines " Jaguar," " Lynx," " Mongoose," and " Genet."

At the Paris Aero Show particular interest will attach to the Armstrong-Whitworth exhibits, since this is the only British firm to show aircraft. In addition to the aeroplane to be exhibited, the Armstrong-Siddeley firm will exhibit their complete series of engines, of which the " Mongoose " is an entirely new type and will make its public appearance for the first time at Paris. Having placed on record the fact that the Siddeley aero engines will be on view, we must defer a more detailed reference until next week, the present issue of Flight being devoted exclusively, as far as the Paris Aero Show is concerned, to aircraft.

The aeroplane to be exhibited on the Armstrong-Whitworth stand is the " Ajax," a two-seater general-purpose aeroplane, fitted with the Armstrong-Siddeley " Jaguar " engine. This machine, which can be used either as a general purpose reconnaissance machine or as a two-seater fighter, may be said to be the two-seater development of the " Siskin " family with which our readers are already familiar. It is characterised by a very compact form and an excellent speed range, as well as by good controllability at all speeds. The normal load of the machine is 400 kgs., and fuel for a range of 800 kms. at cruising speed. This may be increased by 120 kgs. for special purposes. The top speed of the " Ajax " is 225 km./h. and the ceiling with normal load is 6,000 metres.

The engine normally fitted is the Armstrong-Siddeley " Jaguar " of 385 h.p. If a higher performance is required, or particularly a higher ceiling, the supercharged engine of the same type may be used. The " Jaguar " engine is entirely accessible. Inspection and running adjustments are easily made. A fireproof bulkhead is fitted behind the engine. Petrol and oil filters of ample size are provided in accessible positions. The petrol is fed from a gravity tank divided into two compartments, mounted inside the fuselage. Reference has already been made to the good controllability, which extends right down to, or beyond, the stalling angle, and the machine can be flown indefinitely without the use of controls, being very stable as well as manœuvrable.

The undercarriage is of the type in which the shock of alighting is taken by an oil buffer so as to relieve the frame of



The Armstrong-Whitworth "Ajax": A two-seater general purpose aeroplane with "Jaguar" engine. Can be fitted with float undercarriage.

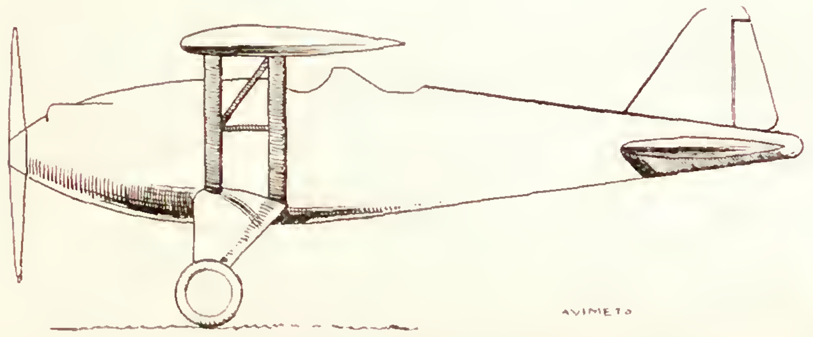
undue stresses, and to prevent bouncing. The tail skid is controlled by the rudder bar, so that the machine can be steered with accuracy on the ground.

Specification of Armstrong-Whitworth "Ajax":—Weight empty, 1,018 kgs.; fuel and oil, 262 kgs.; military load, 400 kgs.; total loaded weight, 1,680 kgs. Speed at ground level, 225 km./h.; speed at 3,000 m., 220 km./h.; slow speed, 95 km./h. Climb to 3,000 m. in 11 mins. Climb to 5,000 m. in 24 mins. Ceiling, 6,000 m. Endurance at a cruising speed of 200 km./h. 4 hours. Range 800 kms.

AVIMETA

The *Société pour la Construction dAvions Métallique "Avimeta,"* with offices in Paris and Works in Courbevoie (Seine), is the outgrowth of the former Aeronautical Department of the Schneider-Creusot armament firm, in which Captain Georges Lepère and M. André Lesage are associated as before.

The new firm exhibits at the *Salon* its AVM 88 two-seater reconnaissance-fighter, fitted with a 595 h.p. Hispano-Suiza engine. This is a strut-braced semi-cantilever monoplane, which incorporates an excellent streamline and is entirely built of the Schneider light alloy *Alférium*. The wing spars are lattice girders. The fuselage is of square cross section with rounded corners, and is built up on four longerons and a number of formers which are braced by a trellis work. Both wings and fuselage are covered with sheet *Alférium*, which is riveted to the framing and is externally ribbed for local stiffness.



The Avimeta AVM 88 is a two-seater reconnaissance-fighter with Hispano Engine

The undercarriage consists of two independent, faired sheet metal frames, with no axle between them, which carry each a wheel sprung by rubber chords housed inside the body or the wheel.

The petrol tank, which has a capacity of 420 litres, is of the S.E.M.A.P.E. crash-proof type and can be jettisoned in flight. The oil tank has a capacity of 40 litres.

The armament consists of two synchronised guns, two wing guns and two flexible guns on a ring mount. Each gun is provided with 500 rounds of ammunition.

Specification.—Engine: 500 h.p. Hispano-Suiza. Span: 17·00 m. Length: 9·76 m. Height: 3·55 m. Wing area: 40 sq. m. Weight, empty: 1,550 kgs. Fuel load: 310 kgs. Useful load: 540 kgs. Weight, loaded: 2,400 kgs. Maximum speed, sea level: 240 km.p.h. Speed at 5,000 m.: 220 km.p.h. Climb to 5,000 m.: 16 mins. Ceiling: 7,500 m. Safety factor: 12.

BERNARD (FERBOIS)

The Bernard (Ferbois) Company, which is also designated at times by the initials S.I.M.B., exhibits at the *Salon* the Bernard 15 C.1 single-seater fighter with 500 h.p. Hispano-Suiza engine.

The Bernard 15 C.1 is a single-bay sesquiplane of timber construction, with a steel tube cabane and steel tube interplane struts of Y type. The bottom wing is placed aft with respect to the top wing, and thus affords the pilot excellent visibility. The wings are plywood-covered. The fuselage structure consists of two longitudinal main frames with stringers at top and bottom; the whole is plywood-covered.

The engine mounting consists of duralumin box girders and tubes; it is quickly detachable. The radiators are of the Lamblin eclipse type.

The armament consists of two synchronised and two wing guns, with 1,400 rounds of ammunition.

Specification.—Engine: 500 h.p. Hispano-Suiza. Span: 11·40 m. Length: 7·50 m. Height: 3·10 m. Wing area: 24·5 sq. m. Weight, loaded: 1,800 kg. Maximum speed, sea level: 260 kms.p.h. Speed at 5,000 m. altitude: 250 kms.p.h. Ceiling: 9,000 m.

MARCEL BESSON

Marcel Besson & Cie, of Boulogne-sur-Seine, who have produced during the past few years marine aircraft of the largest and of the smallest size, exhibit a Besson M.B.35 Submarine Scout (120 h.p. Salmson engine) and a Besson three-engined sea-monoplane fitted with 420 h.p. Gnôme-Rhône Jupiter engines.

The Besson MB..35 Submarine Scout is a low-wing, twin-float monoplane of conventional construction. The framing of the wings and of the fuselage is of timber, wire-braced, and fabric-covered; the undercarriage struts are steel tubes. This machine has been built with a special view to its being capable of quick dismantling and stowing away in small holds, such as are found on board cruiser submarines. With the wings removed, the machine fits into a packing case 7 m. by 4 m. by 4 m. which allows sufficient room for a mechanic to work on the engine. The wings may be dismantled in 10 mins.

Specification.—Engine, 120 h.p. Salmson (air cooled); span, 9·85 m.; length, 7·00 m.; height, 2·40 m.; wing area, 16·5 sq. m.; weight empty, 540 kg.; weight loaded, 765 kg.; Max. speed, sea level, 163 km.p.h.; climb, 2,000 m., in 12 min.; ceiling 4,200 m.

BLÉRIOT-AÉRONAUTIQUE

The exhibit of Blériot-Aéronautique consists of (*a*) the Spad-61 altitude record type aeroplane, with 450 h.p. Lorraine-Dietrich engine, on which M. Callizo established the existing world's record with 12,442 m. on August 23, 1926; (*b*) the fuselage of a Blériot-165 transport aeroplane; (*c*) a Blériot variable pitch propeller; and (*d*) a Blériot elastic wheel.

*The Spad-*61 *Altitude Record Aeroplane.*—The Spad-61 altitude record aeroplane is constructionally identical with the well-known Spad-61 single-seater fighter, 350 of which type were recently delivered to the Polish Air Force. The wings have duralumin spars and interplane struts, and wooden ribs, the framing being covered with fabric. The fuselage is of monocoque construction. The wings have 7 sq. m. more wing area than the single-seater-fighter, but the weight loaded is the same in both types (1,522 kg.).

A WORLD'S RECORD HOLDER: The Spad 61 holds the world's record for altitude.

The 450 h.p. Lorraine-Dietrich engine is equipped with a Rateau super-charger of the turbine type.

*Specification of the Spad-*61 *Altitude Record Aeroplane.*—Engine, 450 h.p. Lorraine-Dietrich; span, 11·72 m.; length, 7·185 m.; height, 3·20 m.; wing area, 37 sq. m.; weight, empty, 1,147 kg.; fuel load, 285 kg.; useful load, 90 kg.; weight loaded, 1,522 kg.; maximum speed, sea level, 283 km.p.h.

The Blériot 165 *Transport Aeroplane.*—The Blériot 165 transport aeroplane, which is now undergoing tests at Villacoublay, is a twin-engined adaptation of the Blériot 155 four-engined transport machine. It is understood that the Blériot 165, which is fitted with two 420 h.p. Gnôme-Rhône Jupiter engines, will be placed on the Paris-London service

The Bleriot 165 is a commercial aeroplane fitted with two "Jupiter" engines.

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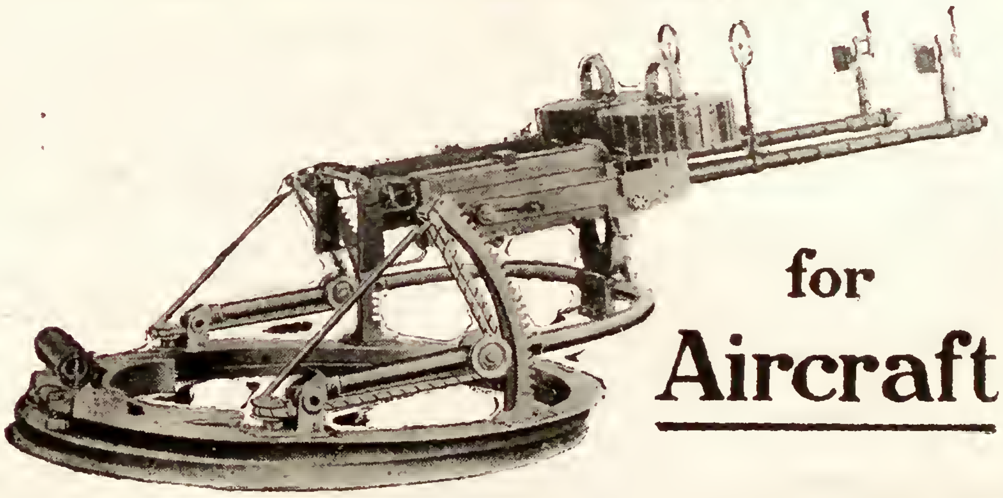

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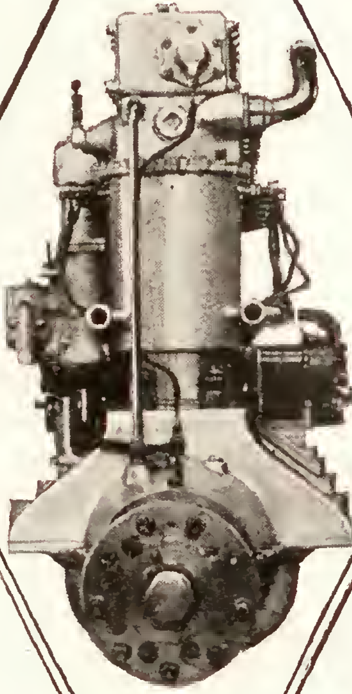
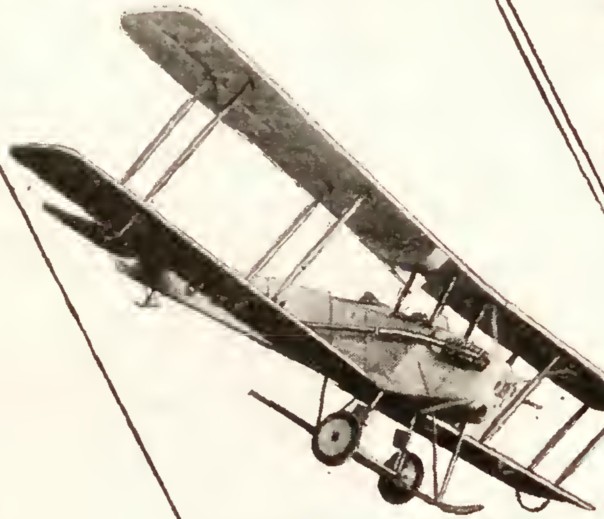
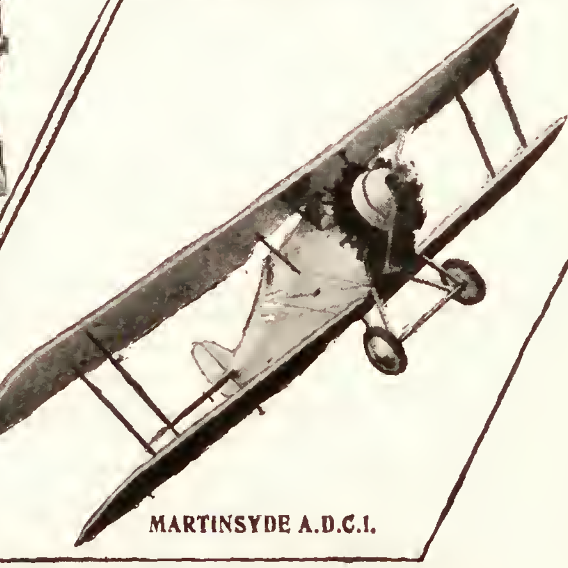


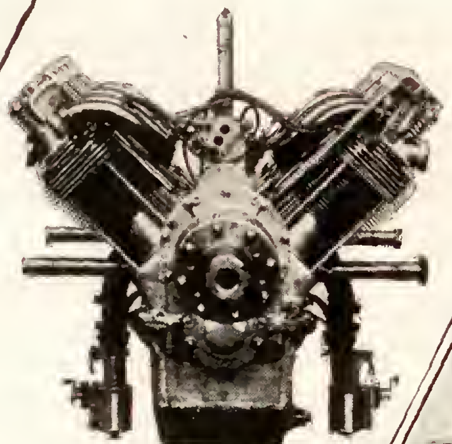
300-330 h.p. A.D.C. 'NIMBUS.'



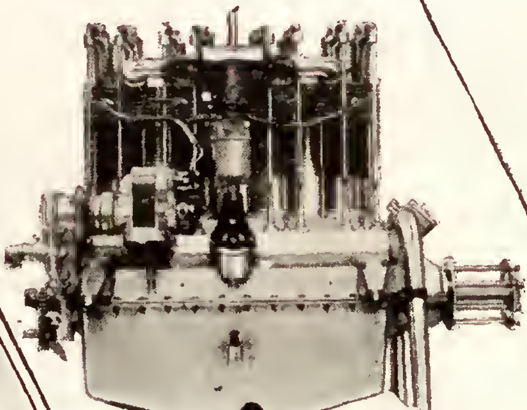
"AIRDISCO" Avro type 504K.



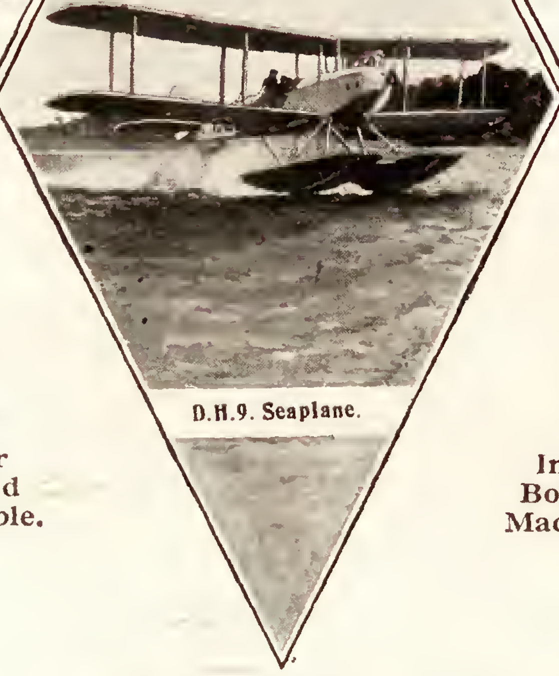
MARTINSYDE A.D.C.I.



120/140 h.p. A.D.C. "AIRDISCO."



27/60 h.p. A.D.C. "CIRRUS."



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by the Air Union and that the four-engined machines of this type which were on order for this company will be transformed into twin-engined types.

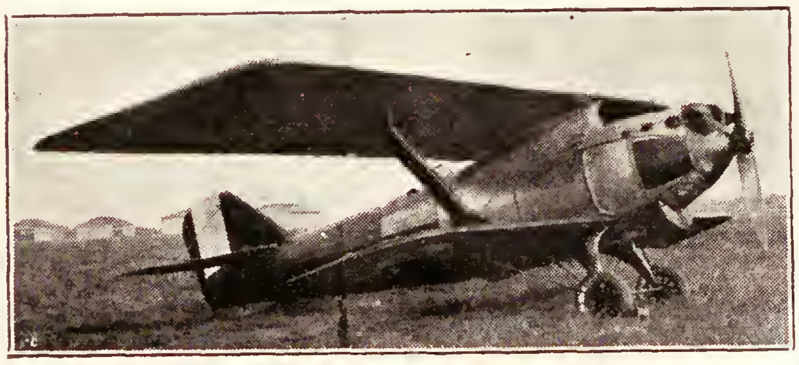
The Blériot 165 is timber-framed throughout. The cabin, which accommodates 16 passengers, is very spacious and comfortable. A dual pilot's cockpit is fitted in the nose of the machine, and underneath this cockpit there is a luggage hold of 3 cub. m. capacity.

Specification of the Blériot 165 Transport Aeroplane.—Engines, two 420 h.p. Gnôme-Rhône Jupiter; span, 23·00 m.; length, 15·00 m.; height, 4·50 m.; wing area, 119 sq. m.; weight, empty, 3,100 kg.; fuel load, 750 kg.; useful load, 1,600 kg.; weight, loaded, 5,450 kg.; maximum speed, sea level, 180 km.p.h.

BREGUET

THE Louis Bréguet firm's exhibit at the *Salon de l'Aéronautique* will consist of three machines: (1) a Bréguet 19 G.R. (500 h.p. Hispano-Suiza), holder of the world's straight-line distance record; (2) a Bréguet 19 H. distant reconnaissance and bombing seaplane (450 h.p. Lorraine-Dietrich); and (3) a Bréguet 26 T six-passenger transport aeroplane (420 h.p. Ghôme-Rhône Jupiter).

The Breguet 19 G.R. Distance Record Aeroplane.—This is the type of machine on which the world's straight-away distance record was thrice broken between July 15 and November 1 of this year: first, from Paris to Omsk (Siberia), 4,715 km. in 27 hrs., by Captain Girier and Lieut. Dordilly; second, from Paris to Bunder Abbas (Persia), 5,200 km. in 27 hrs., by Lieut. Challe and Captain Weiser; and third, from Paris to Djask (Persia), 5,400 km. in 32 hrs., by Lieut. Costes and Captain Rignot. The particular machine shown at the *Salon* is the one which made the Paris-Omsk and Paris-Djask flights, as well as the record attempt of Costes and Lieut. de Vitrolles from Paris to Assouan (Egypt). It has up to now covered a total distance of more than 40,000 km. (the length of the Equator) without having undergone any repair or change of engine, a 500 h.p. Hispano-Suiza.



THE BREGUET XIX, with 500 h.p. Hispano engine. This is the type which made the Paris-Omsk and Paris-Djask non-stop flights.

The Bréguet 19 G.R. differs only in minor particulars from the well-known type 19 A.2 corps observation and 19 B.2 day bombing aeroplanes, of which approximately 1,300 have so far been furnished to the French Military Air Service and several hundred to the Air Forces of Poland, Yugoslavia, Spain and Japan. The framing of the type 19 is entirely of duralumin, pin-jointed and wire braced tubes being used in the fuselage, and built-up, riveted strips in the wing structure. The forward portion of the fuselage is covered with sheet aluminium, while the rear portion, the wings and the tail are fabric-covered.

The type 19 G.R. differs from the military type by having a slightly increased wing area (52·75 sq. m. as against 50 sq. m.), which is obtained by filling in the cut-out of the top wing; fuel tanks of much greater capacity (3,100 litres of petrol and benzol and 200 litres of oil), as a result of which the two cockpits have been removed further aft; and slightly increased tail surfaces. There is one big petrol tank (2,250 litres) just behind the engine; two additional petrol tanks on the sides of the fuselage, and two oil tanks of 100 litres capacity each on either side of the engine.

Equipped for the Paris–Djask flight, the Bréguet 19 G.R. had the following weight schedule:—

Weight equipped	1,518 kg.
Weight of crew, food and baggage . .	250 kg.
Weight of fuel (3,100 litres of petrol and benzol)	2,209 kg.
Weight of oil (200 litres)	180 kg.
Weight, loaded	4,157 kg.

The maximum range of the machine, in still air, was approximately 6,200 km.

The Bréguet 19 H Reconnaissance Seaplane

The Bréguet 19 H Reconnaissance Seaplane, which may be fitted with any power plant of 400–500 h.p., is the sea-going edition of the type 19 A 2. The machine is equipped with twin floats of sheet duralumin. These floats are 8 m. long, with a maximum diameter of 0·80 m., and have a capacity of 2,600 litres each.

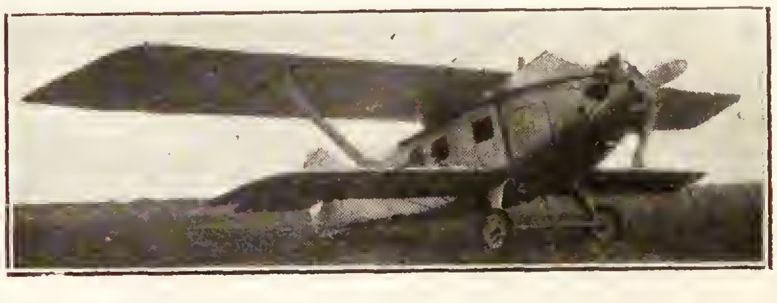
Specification of the Bréguet 19 H Seaplane.—Engine, 420 h.p. Gnôme-Rhône Jupiter or 450 h.p. Lorraine-Dietrich; span (top), 14·83 m.; span (bottom), 11 m.; length, 11·52 m.; height, 4 m.; wing area, 50 sq. m.; weight, empty (Jupiter engine), 1,235 kg. (Lorraine engine), 1,350 kg.; fuel load (435 litres petrol and 50 litres oil), 350 kg.; useful load, 750 kg.; weight loaded (Jupiter engine), 2,335 kg. (Lorraine engine), 2,450 kg.

Maximum speed, sea level, 200 km.p.h.; climbing time, 1,000 m. in 4 mins. 40 secs.; 2,000 m. in 10 mins. 35 secs.; 3,000 m. in 18 mins. 25 secs.; 4,000 m. in 30 mins. Ceiling, 5,600 m.

The Bréguet 26 T Transport Aeroplane.—The Bréguet 26 T Transport Aeroplane is the first adaptation of the type 19 to the requirements of civil aviation. No changes have been made in the constructional methods, save that the central portion of the fuselage, which encloses the passenger cabin, is covered with plywood and that the top wing, instead of being mounted on a stream-lined cabane, is fixed flush with the roof of the cabin.

Although the 26 T retains unmistakable Bréguet lines, the noteworthy depth and width of the fuselage somewhat detract from the beautiful streamlines of the type 19. But this is only natural, considering the large cubic capacity modern transport aeroplanes require for efficient operation.

The machine may be provided with two standard engine mountings: one for the 420 h.p. Jupiter air-cooled radial, and the other for the 450 h.p. Lorraine-Dietrich, or for the 450 h.p. Hispano-Suiza. Two long exhaust pipes lead the gases behind the cabin, thus greatly reducing the noise in flight.



THE BREGUET XXVI T, with "Jupiter" engine is an all-metal commercial aeroplane.

The cabin seats six passengers, but there is room enough for fitting a seventh seat, if required. There are two luggage holds, one just behind the cabin and the other underneath the pilot's cockpit, which is situated in front of the wings, where the pilot enjoys maximum range of vision in all directions.

As this machine is still undergoing official tests, no performance figures are available. The wing area is 55 sq. m., the weight, loaded (with 420 h.p. Jupiter engine), 2,825 kg., and the estimated maximum speed 204 km.p.h.

This machine is incidentally considered as a transition type which will be replaced by type 28 T. This last-named aeroplane will have a span of 17 m. and a wing area of 57 sq. m., and will carry eight passengers instead of six.

The following official performances are given for the Bréguet 28 T transport aeroplane (420 h.p. Jupiter):—

Maximum speed, sea level, 198 km.p.h.; climbing time, 2,000 m. in 15 mins., 3,000 m. in 28 mins.; ceiling, 4,500 m.; unstick run, 220 m.; range in still air, 800 km.

These performances were obtained with the following weight schedule:—

Weight, empty, 1,400 kg.; equipment (instruments, W/T, seats, &c.), 104 kg.; crew (1), 85 kg.; petrol (500 litres), 360 kg.; oil (60 litres), 56 kg.; pay load (passengers and goods), 1,000 kg.; weight, loaded, 3,005 kg.

C.A.M.S.

THE exhibit of the C.A.M.S. firm (*Chantiers Aéro-Maritimes de la Seine*) of Paris and Saint-Denis will be found this year on the stand of the Ministry of Marine in the shape of a type C.A.M.S. 37A three-seater fleet spotting amphibian.

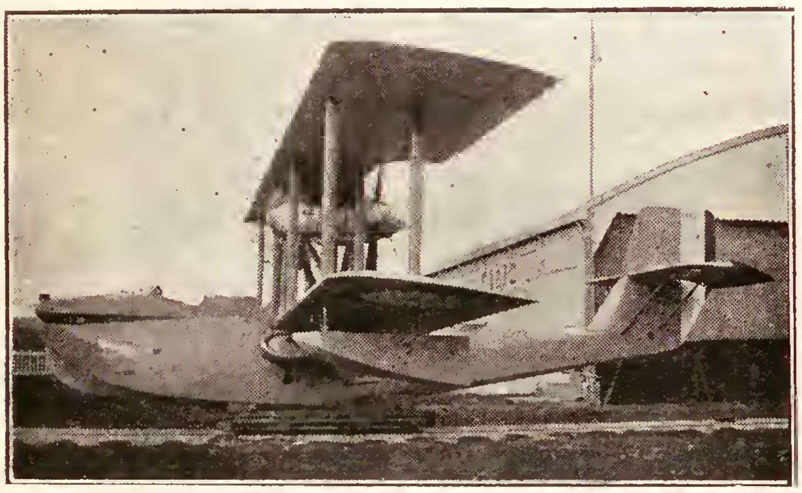
This machine is a single-bay biplane pusher flying-boat, fitted with a 450 h.p. Lorraine-Dietrich engine. The crew of three are disposed as follows: a gunner-radio operator in a cockpit in the bows, the pilot forward of the lower wings, and a second gunner aft of the wings in a cockpit which is fitted with dual controls. The C.A.M.S. 37A is a seaplane of conventional design, with timber-framed hull and wings. The hull has a single step and a Vee bottom, and is divided into a number of water-tight compartments. The longerons and the framing of the bulkheads (formers) are of ash; the secondary members are of spruce. The step is of ash, and is reinforced by galvanised sheet steel. The bottom of the hull is of triple planking, one layer of plywood and two layers of teak, while the sides of the hull have double planking. The vertical fin is built integral with the hull, and is covered with plywood. The hull is reinforced in the region of the propeller.

The amphibian gear, when not in use, folds up sideways against the wings. The shock-absorbing system comprises a number of rubber discs in compression.

The wings fold back against the hull for rapid stowage on board ships. The wing spars are of the box type, made of spruce and with veneer reinforcement webs. The wings are covered with fabric.

The 450 h.p. Lorraine-Dietrich engine is enclosed in a well streamlined cowling and actuates either direct-drive or a geared-down pusher airscrew.

The entire machine is quite noteworthy for its excellent streamlining and low parasitic resistance. A special mention should be made of the peculiarly-shaped "balcony" of the observers (forward) cockpit, which is reminiscent of the Zeppelin control car, and seems to be the rage in present-day French naval aircraft design.



THE C.A.M.S. 37 A. is an Amphibian, with 450 h.p. Lorraine-Dietrich engine. It is used as a fleet spotter.

Specification of the C.A.M.S. 37A Amphibian Flying-boat—Engine, 450 h.p. Lorraine-Dietrich; span, 14·50 m.; length, 11·43 m.; height, 4·04 m.; wing area, 58 sq. m.; weight, empty, 2,000 kg.; total useful load, 900 kg.; weight, loaded, 2,900 kg.; cruising range, 6 hrs.; max. speed, 170 km.p.h.; min. speed, 90 km.p.h.; climb, 3,000 m. in 35 mins.; ceiling, 4,000 m.; safety coefficient, 7·5.

(The above performances were obtained with the landing gear in lowered position.)

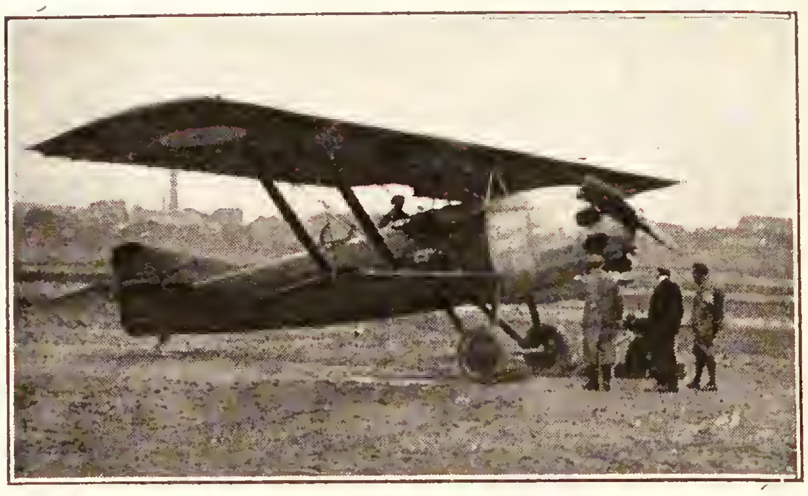
CAUDRON

THE *Société des Avions Caudron* exhibits at the *Salon de l'Aeronautique* a Caudron C.104 G.R. Two-Seater Distant-Reconnaissance Fighter fitted with the 420 h.p. Gnôme-Rhône Jupiter engine.

The Caudron C.104 G.R. is a strut-and wire braced sesquiplane of the type of timber construction characteristic and sufficiently well-known to readers of FLIGHT to dispense with more than a bare mention. The wings, the fuselage and the tail surfaces are fabric-covered.

The machine is equipped in accordance with the requirements of the French Military Air Service for this type of aircraft, namely, two fixed, synchronised guns, two flexible guss on a ring mount, a trap-door gun firing under the tail, an internal rack for twelve 10-kg. bombs, W/T, electrical heating and lighting installation, signal flares, oxygen inhalators and parachutes. Each machine gun is supplied with 500 rounds of ammunition.

Specification.—Engine, 420 h.p. Gnôme-Rhône Jupiter; Span, 14·56 m.; length, 9·50 m.; height, 3·27 m.; wing area, 44 sq. m.; weight equipped, 1,377 kg. (equipment, 227 kg.; armament, 116·5 kg.); weight of fuel, 270 kg.; weight of crew, 160 kg.; disposable load (ammunition, camera or W/T), 158 kg.; weight loaded, 1,965 kg.; max. speed, 209 km.p.h. at 1,000 m.; 207·5 km.p.h. at 2,000 m.; 204·5 km.p.h. at 3,000 m.; 198 km.p.h. at 4,000 m.; 186 km.p.h. at 5,000 m.; 158 km.p.h. at 6,000 m.; climb; 1,000 m. in 3 mins. 18 secs.; 2,000 m. in 7 mins. 27 secs.; 3,000 m. in 12 mins. 44 secs.; 4,000 m. in 19 mins. 44 secs.; 5,000 m. in 28 mins. 50 secs.; 6,000 m. in 59 mins. 39 secs.; service ceiling, 6,375 m.



The Caudron C.104 G.R. long-distance reconnaissance two-seater with "Jupiter" engine.

The following alternate engine equipment may be fitted to the Caudron G.R. machines: type C.101-450 h.p. Hispano-Suiza; type C.103-450 h.p. Lorraine-Dietrich; type C.107-500 h.p. Salmson.

DESCAMPS

THE exhibit of the *Société des Avions Descamps*, of Sevres (Seine-et-Oise), consists of a Descamps A.2 two-seater reconnaissance-fighter, with 450 h.p. Lorraine-Dietrich engine.

The Descamps A.2 is a sesquiplane entirely built of duralumin, including the covering of the wings and of the fuselage. The top wing is trussed to the bottom wing by a species of Warren truss, consisting of streamlined N-struts. The undercarriage has streamlined mudguards.

The armament consists of two synchronised guns and of two flexible guns on a ring-mount.

Specification.—Engine, 450 h.p. Lorraine-Dietrich engine span, 14·50 m.; length, 9·35 m.; height, 3·35 m.; total wing area, 44 sq. m.; weight empty, 1,250 kg.; weight loaded, 2,000 kg.

As, at the time of writing, this machine was still undergoing performance tests before the S.T.Aé, no performance figures are available. The following performances were obtained with a machine of the same type fitted with a 400 h.p. Lorraine-Dietrich engine:

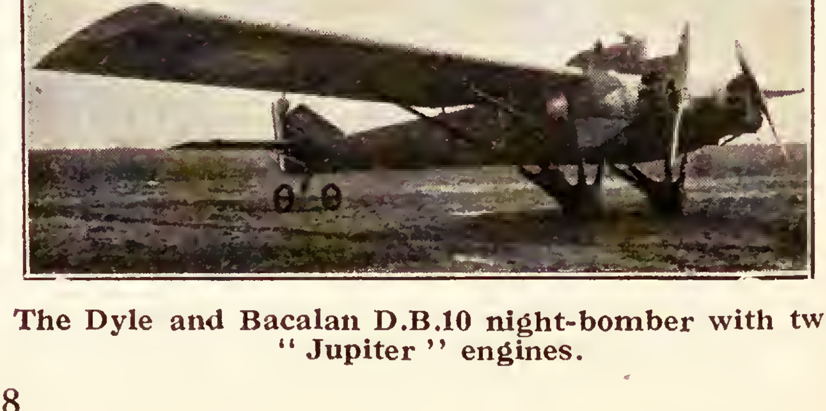
Max. speed: 203 km.p.h., at sea level; 202 km.p.h. at 2,500 m. alt.; 185 km.p.h. at 4,000 m.; 177 km.p.h. at 6,000 m. (ceiling).

Climb: 1,000 m. in 3 mins. 11 secs.; 2,000 m. in 7 mins. 47 secs.; 3000 m. in 13 mins.; 4,000 m. in 21 mins. 24 secs.; 5,000 m. in 36 mins.

DYLE ET BACALAN

THE *Société Anonyme de Travaux Dyle et Bacalan*, a newcomer in the field of French aircraft construction, will show at the *Salon de l'Aviation* the central portion of the latest Dyle and Bacalan Night Bomber, type D.B. 10, which is fitted with two 420 h.p. Gnôme-Rhône Jupiter engines.

The D.B. 10 is a strut-braced, twin-tractor monoplane with a central fuselage of unusual lines. The forward portion of the fuselage carries on either side an excrescence shaped like an aerofoil, which contains the power plant, the fuel tanks, vertical bomb racks and, as a rule, all items of parasitic resistance which it is deemed desirable to hide from the air



The Dyle and Bacalan D.B.10 night-bomber with two "Jupiter" engines.

stream. As these excrescences have as great a maximum depth as the fuselage, the machine possesses an unusually big cubic capacity.

The D.B. 10 is of composite metal construction, that is, steel tubing is used for the wing spars and the wing struts, duralumin tubing for the longerons and cross members, and built-up duralumin strips for the wing ribs. The wings and the tail unit are fabric covered, and so is the fuselage, except around the engines where sheet aluminium is used.

The engine mounting is interchangeable with one taking the 450 h.p. Lorraine-Dietrich, or any other stationary engine of similar horse-power.

Specification of the Dyle et Bacalan D.B. 10.—Engines, two 420 h.p. Gnôme-Rhône Jupiter; span, 25 m.; length, 13·60 m.; total wing area, 93 sq. m.; weight, empty, 3,150 kg.; weight, loaded, 5,600 kg.; max. speed, sea level, 195 km.p.h.; ceiling, 6,000 m.

H. & M. FARMAN

The *Société des Avions H. & M. Farman* exhibits the following machines:—(*a*) a Farman F.170 eight-passenger transport aeroplane, with 500 h.p. Farman engine; (*b*) a Farman F.160 night bombing aeroplane, with two 500 h.p. Farman engines; (*c*) a 500 h.p. Farman engine, type 12 W.E.

The Farman F.170 Transport Aeroplane.—The Farman F.170 Transport Aeroplane, which, owing to the lower curvature of its fuselage has been nick-named the *Ventre-à-terre*, is the latest machine of its class produced by the Farman Co. Its production has been the result of extensive experience gained by the constructors on the Paris-Amsterdam line, both with the Goliath and the four-engined Jabiru types. The excellent showing made by the *Ventre-à-terre* on the Paris-Cologne-Berlin service, where it has been in continuous use since last May, and in competition with highly-efficient types of German machines, indicates that the French Commercial Aviation has in the F.170 a machine of unusual merit.

While the Farman Company have, in the construction of this machine, remained faithful to their time-tried practice of using timber in preference to metal wherever a doubt may remain as to the superiority of one or the other—chiefly for reasons of ease of repair and low-production cost—the F.170 may be said to embody all the latest safety features which aerial passengers are entitled to find on modern transport aeroplanes. To begin with, the engine, the 500 h.p. "broad-arrow" Farman 12 W.E., has a record of endurance and reliability unsurpassed, for it holds both the world's endurance records for 1924 and 1925, with 38 and 45 hours, respectively, and it also powered Lieut. Challe and Captain Weiser's Bréguet 19 G.R. in their Paris-Bunder Abbas flight, when they broke the world's distance record by flying 5,200 km. non-stop, in 27 hrs.

The Farman F.170 with 500 h.p. Farman engine is an eight-passenger commercial aeroplane.

In the second place, the 1 : 2 reduction gear of the Farman engine enables the pilot to fly the machine throttled down with great efficiency, which will be evident from the fact that at a cruising speed of 150 km.p.h. the engine only develops 300 h.p., thus giving a "pay-loading" of approximately 3 kg./h.p.

Special safeguards against fire hazard are incorporated in this machine. Chief of these is the position of the petrol tanks in the wings, well removed from the engine compartment to give added safety to the system already embodying a fire-proof bulkhead, instantaneous blocking devices in the petrol lines and fire extinguishers.

Structurally, the chief characteristic of the F.170 is the great simplicity and straightforwardness of the design. All stress-bearing elements are of liberal size, great simplicity and evident sturdiness, the machine being obviously designed for hard usage. The framing of the wings and of the fuselage are of timber, with sheet steel fittings and wire bracing. The wings are fabric-covered, and so is the fuselage, except around the engine, where sheet aluminium is used, and the doors of the cabin and the freight hold, which are reinforced plywood panels. The engine cowling is hinged so that the engine becomes quickly accessible. The wing bracing and under-carriage struts are faired steel tubes. The wings are fixed to the fuselage by four bolts.

Considerable attention has also been paid to the comfort of the passengers. The cabin is fitted with eight very comfortable chairs and is equipped with electric lights and water radiators. Large windows coupled with the high wing give a good view of the ground. The noise of the power plant is practically abolished by a long exhaust pipe which ends aft of the cabin. Luggage and other freight is carried in two holds with separate entrances, one of these being aft of the cabin, and the other underneath the pilot's cockpit. The latter is situated flush with the leading edge of the wings and affords excellent visibility.

Specification.—Engine, 500 h.p. Farman; span, 16·10 m.; length, 11·76 m.; height, 3·20 m.; total wing area, 52·50 sq. m.; weight, equipped, 2,018 kg.; weight of fuel, 370 kg.; weight of crew (1), 80 kg.; pay load, 850 kg.; weight, loaded, 3,318 kg.; max. speed, 202 km.p.h. at sea level, 197 km.p.h. at 1,000 m., 191 km.p.h. at 2,000 m., 183 km.p.h. at 3,000 m.; speed at 9/10th power output, 190 km.p.h.; commercial speed (3/5th power output), 150 km.p.h.; cruising range in still air, 750 km.; climb, 1,000 m. in 2 mins. 52 secs. 2,000 m. in 14 mins. 25 secs., 3,000 m. in 27 mins. 21 secs., 4,000 m. in 58 mins. 45 secs.; service ceiling, 4,300 m.

The Farman F.160 Night Bomber.—The Farman F.160 Night Bomber is essentially the latest revised edition, with two 500 h.p. Farman engines in place of the Salmsons or Lorraines, of the well-known F.60 type or Goliath *militaire*, which exists in quantities in the French and the Polish Military Air Services. The naval torpedo-dropping version of the Goliath, fitted with two 420 h.p. Gnôme-Rhône "Jupiters," is known as the F.150.

The extensive experience obtained with all these earlier types has been incorporated in the F.160, which is, like its forerunners, an equal-winged, two-bay, twin-tractor biplane. The machine is timber-framed throughout, with steel fittings and wire bracing. The wings, the tail surfaces and the greater part of the fuselage are fabric-covered; the habitable portion of the fuselage, containing the navigation and bombing room, forward, the pilots' cockpit, and the after gunner's post, are covered with plywood.

The nose of the fuselage is built in the shape of a balcony which gives maximum visibility for observation and bombing work. The observation room contains a complete set of navigation instruments, with chart cabinet and folding table, and the bomb sights and bomb-release controls. The medium-size bombs are carried in vertical racks inside the fuselage, aft of the pilot's cockpit. Fittings for carrying additional medium-sized bombs of up to 200 kgs. and two big bombs of over 400 kgs., are provided for on the lower wings. The normal military load includes a crew of four (pilot, navigator-bomber, mechanic, gunner), five machine guns (two each on gun rings fore and aft, and one aft, firing through the floor), with the necessary ammunition, 1,200 kgs. of bombs, and fuel for a 1,000-km. flight. While this is the normal load of the machine, both the fuel tanks and the bomb racks permit of carrying an additional load of approximately 1,000 kgs., the maximum bomb load being then 2,750 kgs. and the maximum fuel load 1,700 kgs. A W/T room, with sending and receiving apparatus, is fitted aft of the vertical bomb racks and forward of the rear gun-post. Normally, the mechanic, for whose use a folding seat is provided alongside the pilot's seat, is the W/T operator.

The F.160 is equipped with a complete electrical installation for starting, lighting, heating and W/T purposes. The generators, which provide the electrical energy for the W/T and for lighting, are driven from the engines, but they can also be actuated by the starting batteries. The latter provide for about 200 starts.

Specification.—Engines, two 500 h.p. Farman; span, 26·75 m.; length, 14·90 m.; height, 5·30 m.; total wing area, 200 sq. m.; weight, empty, 4,000 kgs.; normal useful load, 3,000 kgs.; weight (normally) loaded, 7,000 kgs.; max. speed, sea level, 186 km.p.h.; speed at 3,000 m. altitude, 178 km.p.h.; climb to 2,000 m., 11 mins., 4,000 m. 30 mins. theoretical; ceiling, 6,000 m.

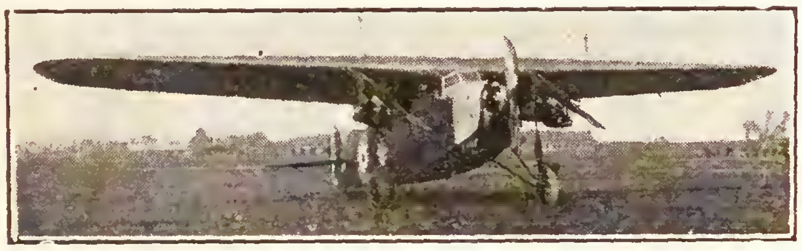
The Farman F.160 can also be fitted as a torpedo-dropper, in which case twin-floats take the place of the land under-carriage. The additional weight of the floats is allowed for in the excess load mentioned above.

Equipped as a seaplane, the F.160 carries the same normal useful load of 3,000 kgs. as the land-going model, but the performance is naturally lowered as follows: Max. speed, sea level, 180 km.p.h.; climb, 2,000 m. in 35 mins; theoretical ceiling, 4,500 m.

FOKKER

The famous Dutch aircraft constructor, whose firm is the *N. V. Nederlandsche Vliegtuigenfabriek* of Amsterdam, will be represented by two aeroplanes, one a commercial type and one a military. The former is the three-engined monoplane type F.VII–3m., similar to that on which Commander Byrd flew to the North Pole, and the latter is the C.V. two-seater fighter.

The Fokker F.VII–3m. monoplane is fitted with three Armstrong-Siddeley "Lynx" engines of 185 h.p. each, and is of the familiar form of Fokker construction with welded steel tube fuselage and all-wood wing. The pilot's cockpit has accommodation for two pilots, and dual controls are provided. The cockpit is equipped with night-landing equipment, and there is ample room for wireless apparatus. A door in the rear wall of the cockpit gives access to the passengers' cabin, which has seating accommodation for 8 passengers. In addition to heating and ventilating arrangements there is a lavatory at the rear end of the cabin, and behind that again, with a separate door in the side of the fuselage, is a large luggage and goods compartment, a smaller luggage space being provided under the pilots' cockpit.

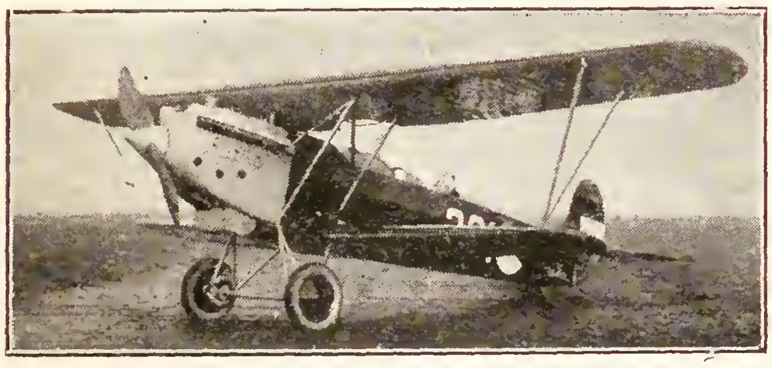


THE FOKKER F. VII. 3m is a commercial monoplane. The three engines fitted are Armstrong-Siddeley "Lynx" of 180 h.p. each.

The Fokker F.VII–3m. can also be used as an ambulance machine, when it gives accommodation for 6 stretchers and one attendant. Furthermore, it can be supplied as a night-bomber, when the armament consists of 1 or 2 machine guns, one of which is fitted over an opening in the roof at the rear of the cabin. As bomb load may be carried 10 bombs of 50 kg. each, or 5 of 100 kg. or 2 of 250 kg. or 1 weighing 500 kilos. The crew consists then of one pilot, one assistant pilot or navigator, and one gunner.

Finally the Fokker F.VII–3m can be supplied as a torpedo carrier, when a torpedo weighing 1,000 kg. can be slung underneath the fuselage. In this case the crew consists of one pilot and one observer.

Specification of Fokker F.VII–3m.—In its commercial form the machine has the following characteristics: Span, 19·3 m.; length overall, 14·6 m.; wing area, 58·5 sq. m. (a larger wing having an area of 67 sq. m. can be supplied). Weight empty, 2,150 kg.; fuel and oil, 600 kg.; crew 150 kg.; 8 passengers and luggage, 700 kg.; total loaded weight, 3,600 kg. Wing loading, 61·5 kg./m²; power loading, 6·6 kg./h.p. Maximum speed, 185 km./h.; cruising speed, 165 km./h.; minimum speed, 80 km./h. The climb is as follows: 1,000 m. in 5·8 mins.; 2,000 m. in 12·3 mins.; 3,000 m. in 22·2 mins.; ceiling approximately 4,700 m. Duration approximately 5 hours. These performance figures are guaranteed to within a margin of 3 per cent. on speed and 6 per cent. on climb.



THE FOKKER C. V. can be supplied with a number of different engines, and can be quickly converted into a two-seater fighter, a reconnaissance machine, a bomber, or even a school machine.

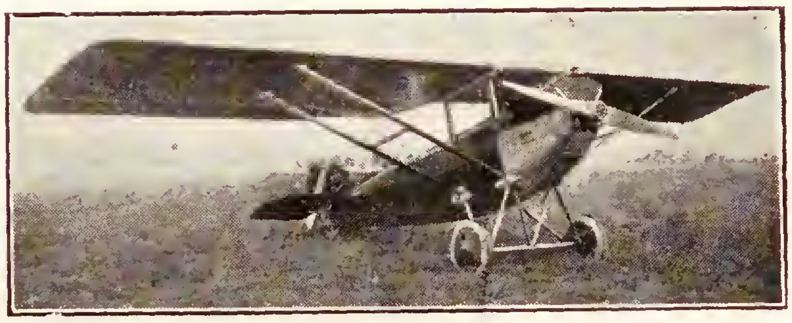
The Fokker C.V.—The machine exhibited at the Paris Show will be fitted with a 450 h.p. Hispano-Suiza engine, but this machine can be fitted with almost any engine, a list issued by the Fokker firm including no less than 10 different types, while the use of different wings etc., affords further combinations possible, so that the C.V. can justly be described as a "general-purpose" aeroplane. Furthermore, it can, if desired, be supplied as a seaplane, so that there is practically no end to the variety of forms which the C.V. may take. The choice of wings for different purposes has been greatly facilitated by the cantilever wing arrangement, which calls for but a very few fittings.

As shown at Paris, the Fokker C.V. will have the "D" cellule, *i.e.*, wings giving a total area of 28·8 sq. m. Constructionally the machine follows normal practice in that it has the welded tube fuselage and the wooden wings with three-ply covering. The engine mounting, in order to allow of a rapid change-over to another type of engine, or of replacing a damaged engine, is a complete unit, attached to the fuselage by four bolts only.

Specification of Fokker C.V:—Wing span, 12·5 m.; length overall, 9·53 m.; wing area, 28·8 sq. m.; weight of machine empty, 1,290 kg.; load 600 kg.; total loaded weight, 1,890 kg. Top speed 255 km./h.; low speed 95 km./h.; climb to 1,000 m. in 2·1 mins.; to 2,000 m. in 4·6 mins.; to 3,000 m. in 7·6 mins.; to 4,000 m. in 11·5 mins.; to 5,000 m. in 17 mins. Ceiling, 6,700 m. With a load of 800 kg. the following performances are obtained; top speed, 252 km./h.; low speed, 100 km./h. Climb to 2,000 m. in 5·6 mins.; to 5,000 m. in 23 mins. Ceiling, 6,300 m.

HANRIOT

The *Avions Hanriot* firm, particularly well known for its training aeroplanes, large numbers of which have been supplied to the French and numerous foreign governments, will exhibit three machines: (1) a type H.35 advanced training aeroplane with 180 h.p. Hispano-Suiza engine; (2) a type H.41 training seaplane with 120 h.p. Salmson engine; and (3) a type H.14S ambulance aeroplane with 80 h.p. Rhône engine.



THE HANRIOT H. 35, with 180 h.p. Hispano engine, is an advanced training machine.

Hanriot H.35 Training Aeroplane

This machine is a strut-braced parasol monoplane which bears a certain resemblance with the Morane-Saulnier training aeroplanes, though, as a matter of fact, the two machines differ considerably in engineering practice.

The H.35 has a composite structure—that is, the wings have duralumin tube spars and lattice work compression members with wooden ribs, the whole being covered with fabric, while the fuselage is built up on four duralumin tube longerons and cross pieces, with wooden fairing members. The fuselage is also covered with fabric, except in the neighbourhood of the engine, where the covering is sheet aluminium. The cabane struts and the lateral bracing struts are faired duralumin tubes, wire-braced.

The landing gear is of the Vee type with a divided, rubber-sprung axle. All the landing gear struts are duralumin tubes.

The ailerons are controlled by means of push-and-pull rods. Dual control is provided; the front control may be declutched from the pilot's seat (at rear), or may be entirely removed if the machine is not to be used for instruction purposes.

The petrol tank is of the gravity type, and is mounted in the centre section. The oil tank is mounted in the engine compartment, and acts at the same time as oil radiator. Fuel for three hours' flight is carried.

Specification of the Hanriot H.35

Engine, 180 h.p. Hispano-Suiza; span, 11·40 m.; length, 7·47 m.; height, 2·75 m.; wing area, 22 sq. m.; weight empty, 600 kg.; useful load, 200 kg.; fuel load, 150 kg.; weight loaded, 950 kg.; maximum speed, 207 km.p.h.; ceiling, 6,500 m.

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The only crossing of the South Atlantic by a single machine was made by Commandante Franco, when he flew from Spain to Buenos Aires, covering 6,259 miles in 59½ hours.

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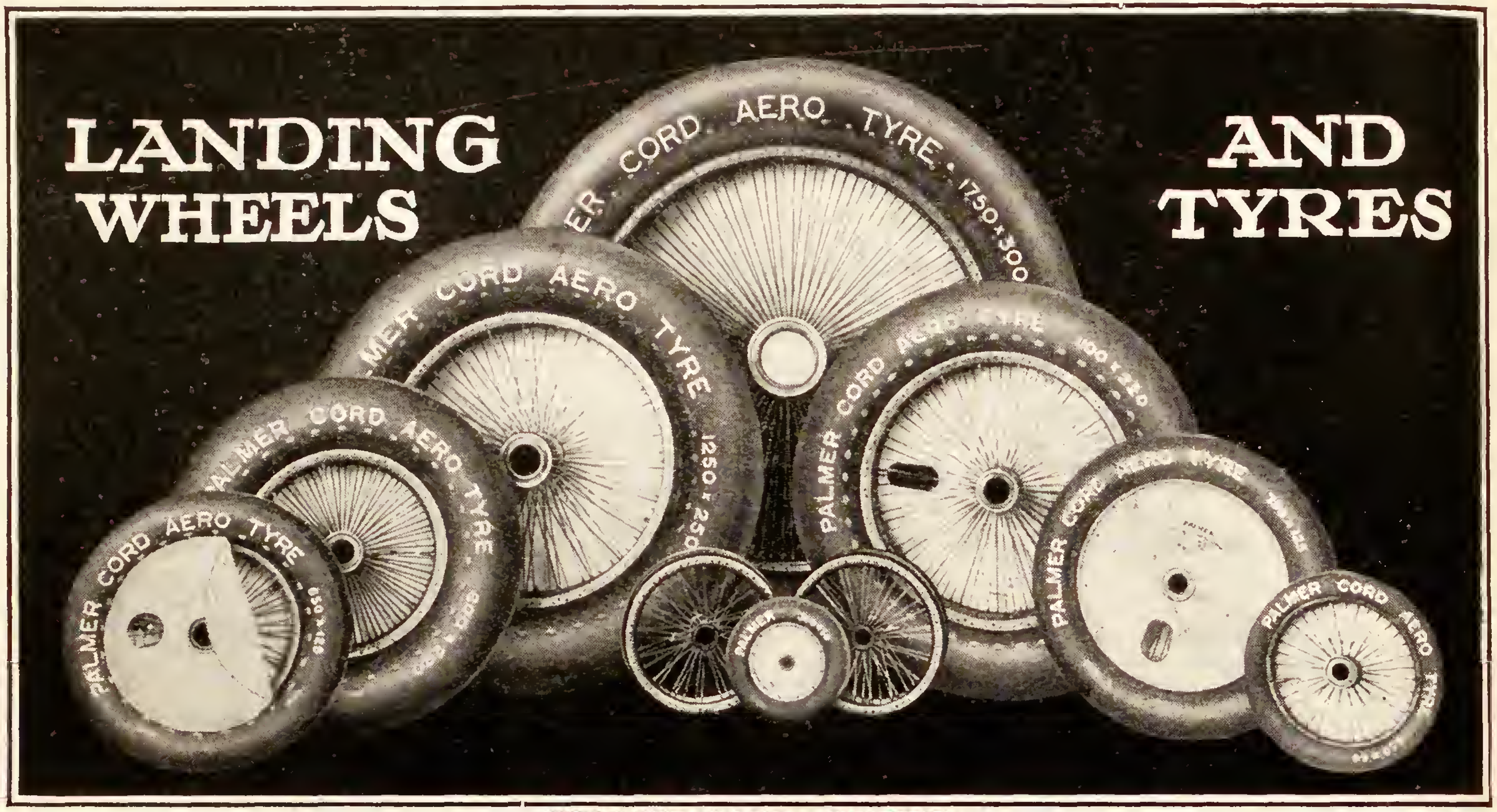

LANDING WHEELS AND TYRES

STANDARD SIZES.

Tyre Size	Wheel No.	Hub		Track Line
		Length	Bore	
		m/m.	m/m	m/m
375 × 55	168	111.12	25.4	Central
300 × 60	16	111.12	25.4	Central
450 × 60	30	89.	31.75	Central
,,	172	130.	38.09	Central
575 × 60	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
650 × 65	78	178.	44.45	132/46
,,	79	178.	44 45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
600 × 75	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
700 × 75	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
700 × 100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46
700 × 100	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
650 × 125	119	178.	55.	132/46
,,	147	178.	55.	Central
,,	188	120.	34.92	Central
750 × 125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
800 × 150	161*	185.	55.	135/50
,,	162*	185.	55.	Central
,,	163*	185.	66.67	135/50
,,	169†	185.	55.	135/50
,,	177	185.	55.	135/50
,,	183	185.	55.	Central
,,	211*	185.	60.32	135/50
1000 × 150	167	185.	55.	125/60
,,	174	250.	80.	Central
,,	182	185.	55.	Central
1000 × 150	187	220.	66.67	Central
,,	201	185.	60.32	125/60
,,	210	185.	60.32	Central
1000 × 180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
,,	166	185.	55.	125/60
900 × 200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	157	185.	80.	Central
,,	202	185.	60.32	Central
1100 × 220	134	220.	66.67	Central
,,	136	250.	80.	Central
975 × 225	192	185.	60.32	Central
,,	194	185.	55.	125/60
1250 × 250	133	250.	80.	Central
,,	154	304.8	101.6	Central
1500 × 300	115	304.8	101.6	Central
,,	126	304.8	152.4	Central
1750 × 300	139	400.	152.4	Central
,,	191	350.	150.3	Central
1750 × 350	193	400.	125.	Central

**Wheels Nos.* 161, 162, 163 *and* 211 *are of stronger type than the other wheels for* 800 × 150 *tyres.* †*Wheel No.* 169 *is fitted with Ball Bearings.*
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D/ND

(865)

Hanriot H.41 Training Seaplane

The Hanriot H.41 (120 h.p. Salmson) training seaplane is an adaptation to the requirements of naval training of the well-known Hanriot H.D.14 training landplane on which Lieut. Thoret made his famous powerless flights of several hours' duration. The H.41 is a twin-float biplane of orthodox timber construction, wire-braced and fabric covered. The floats are built of crossed planking, and are secured to the fuselage by steel tubes.

Specification of the Hanriot H.41

Span, 10·26 m.; length, 8 m.; wing area, 34·9 sq. m.; weight empty, 725 kg.; weight loaded, 1,000 kg.; maximum speed, 120 km.p.h.: minimum speed, 52 km.p.h.

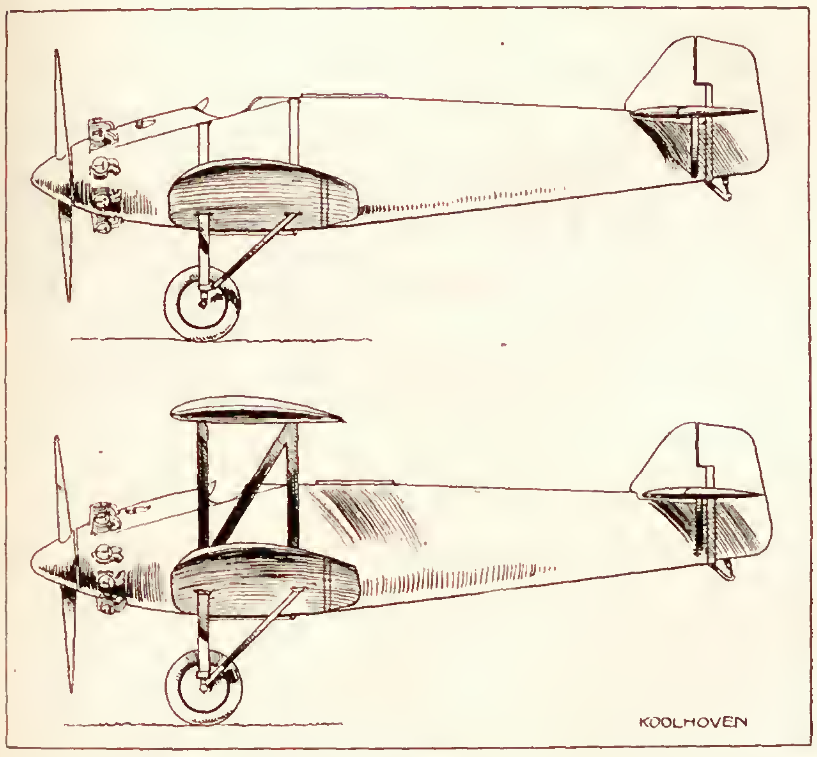
Hanriot H.14S Ambulance Aeroplane

The Hanriot H.14S ambulance aeroplane, which was extensively used during the recent campaign in Morocco, where it rendered great services, is again an adaptation of the H.D. 14 training aeroplane.

The H.14 is fitted with a longitudinal compartment which accommodates one stretcher case. A folding seat is also provided in case it is desired to carry the wounded in a seated position.

KOOLHOVEN

Mr. Frederick Koolhoven, who will be familiar to most of our readers from his work in England before, during and after the war, is exhibiting a very interesting little machine at the Paris Show. The most unusual feature of the machine, which is to be known as the type F.K. 35, is that it can be converted from monoplane into biplane and vice versa. Normally the machine is intended to be a low-wing monoplane, two-seater fighter, but for use by the air forces of smaller nations who wish to make a special study of economy, the machine can be turned into a biplane and used for reconnaissance. The fuselage is of all-metal (tubular) construction, while the wing is of wood and covered with ply-wood. The engine fitted is a Bristol Mark VI "Jupiter."



THE KOOLHOVEN F.K. 35 is a "Jupiter"-engined two-seater fighter, which can be converted from monoplane to biplane and vice versa.

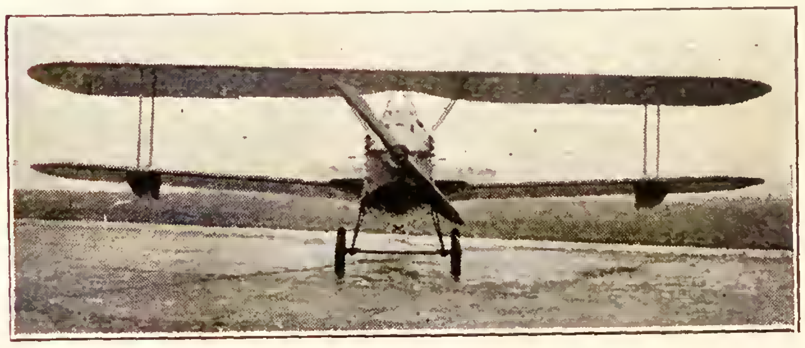
The *F.K.* 35, in addition to its dual form, has several remarkable features in its design, Mr. Koolhoven having ever been strong on originality. Thus, the petrol tanks, which are housed in the wings, are so suspended inside the wings that they can be dropped in case of trouble by the pulling of a lever in the pilot's cockpit. The under-carriage has a very wide track, so that there should be small risk of the machine turning over on the ground. Shock absorption is by an oleo cylinder, a type of undercarriage used by Koolhoven since about 1915.

Another interesting feature of the F.K. 35 is the mechanically operated gun-turret, which enables the gun to be used at high aeroplane speeds. Details of this cannot be given at the moment, but we hope to refer to it in detail in a later article. The armament, incidentally, consists of four guns—two Vickers and two Lewis guns. In addition, there is room in the fuselage for camera or wireless set. Ailerons are fitted to the lower plane only, and run the whole length of the span.

Specification.—Wing span, 10·5 m.; length overall, 8·6 m.; weight of machine empty, 896 kgs.; fuel, 386 kgs.; military load, 286 kgs.; total loaded weight, 1,568 kgs. Speed at 3,000 m., 260 km./hr. Climb to 5,000 m. in 14 mins. Landing speed, 88·5 km./hr.

LEVASSEUR

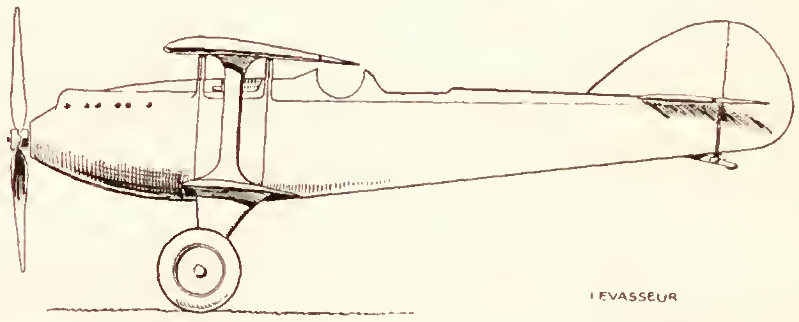
The firm of Pierre Levasseur, which is one of the largest contractors of aircraft to the French Navy, will exhibit at the *Salon* the following machines: (*a*) a three-seater shipboard reconnaissance aeroplane, with 450 h.p. Lorraine-Dietrich engine; (*b*) a two-seater fighter, with 500 h.p. Hispano-Suiza engine; (*c*) a transport aeroplane, with 420 h.p. Gnôme-Rhône Jupiter engine.



The P. Levasseur three-seater naval reconnaissance aeroplane has a detachable undercarriage and a water-tight fuselage.

In addition, there will be found on the Levasseur stand wooden and metal propellers of various types, including the Levasseur-Reed duralumin airscrew, for which this firm is sole licensee for France.

The Levasseur Shipboard Reconnaissance Aeroplane.—The Levasseur shipboard reconnaissance aeroplane belongs to the class of naval aircraft which are designated in France under the term *avion marin*, which does not mean, as some suppose, a seaplane, but rather a seagoing aeroplane. The *avions marins* of the French Navy are used both for shipboard and coastal service, in the carrying out of which work they may have to alight in an emergency on water. For this purpose the lower portion of the fuselage is built in the form of a sturdy water-tight hull, fitted with a step; when the pilot has to alight on water, he merely releases the undercarriage and locks the airscrew in horizontal position; the machine can then come to rest without any danger of nosing over, and will float indefinitely. Wing-tip floats contribute to the hydrodynamic stability of the machine.



The P. Levasseur VI C.2 two-seater fighter with 500 h.p. Hispano Engine.

The wings are timber framed and fabric covered, while the fuselage is mainly built of plywood over two longitudinal main frames, which are joined by a bottom and a top of plywood. This type of construction does away with all wire bracing, and insures absolute water-tightness. The engine mounting is built of steel tubing. The wings may be folded for stowage on board aircraft carriers.

Specification of the Levasseur Shipboard Reconnaissance Aeroplane.—Engine, 450 h.p. Lorraine-Dietrich; span, 14·60 m. (open), 5·67 m. (folded); length, 9·70 m.; height, 3·91 m.; wing area, 60 sq. m.; weight, empty, 1,550 kg.; fuel load, 310 kg.; useful load, 540 kg.; weight, loaded, 2,400 kg.; max. speed, sea level, 185 km.p.h.; speed at 3,000 m. altitude, 175 km.p.h.; climb to 3,000 m. altitude, 20 mins.; ceiling, 5,500 m.

The Levasseur VI C.2 Two-seater Fighter.—The Levasseur VI C.2 two-seater fighter is a landplane which answers the latest requirements of the French Military Air Service for this class of machines. The engine is a 500 h.p. Hispano-Suiza.

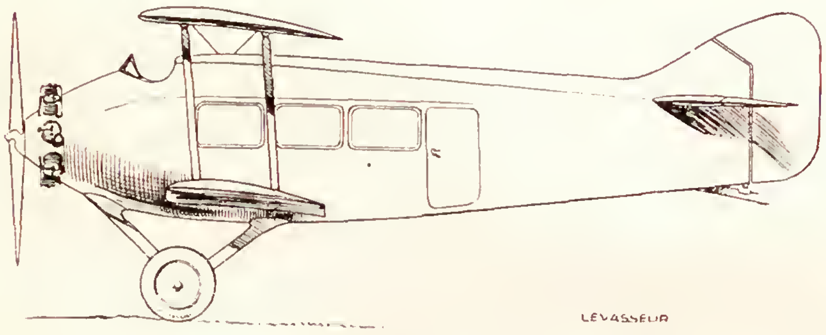
Constructionally the machine resembles the three-seater shipboard reconnaissance aeroplane of the firm, particularly in respect to the fuselage which is built up on two main longitudinal frames in such a way as to do away with all metal fittings and wire bracing. This type of fuselage possesses a remarkable resistance to atmospheric variations. The wings have metal spars, the remainder of the framing being of timber.

Dual control is fitted, and the petrol tank may be jettisoned by the pilot.

A noteworthy point of the undercarriage is that no shock absorbers are fitted to the wheels, their springing being entirely effected by the use of special tyres.

Specification of the Levasseur VI C.2 Two-seater Fighter.—Engine, 500 h.p. Hispano-Suiza ; span, 12·20 m. ; length, 8·75 m. ; height, 3·10 m. ; wing area, 40 sq. m. ; weight, empty, 1,200 kg. ; fuel load, 286 kg. ; useful load, 500 kg. ; weight, loaded, 1,986 kg. ; max. speed, sea level, 215 km.p.h.; ceiling, 7,500 m.

The Levasseur 7 T. Transport Aeroplane.—The Levasseur 7 T. Transport Aeroplane,with a 420 h.p. Gnôme-Rhône Jupiter engine, is a single-bay tractor biplane of simple but sturdy construction. The type of construction is similar to that employed on the two machines described above. The wings may be folded for stowage.



The P. Levasseur 7.T Limousine with "Jupiter" Engine.

The cabin is spacious, and accommodates six passengers in very comfortable seats. The pilot's cockpit is situated right behind the engine and ahead of the wings, thus giving the pilot a maximum of visual range. Behind the pilot's cockpit there is a navigation room which is equipped with wireless telephony.

Specification.—Engine, 420 h.p. Gnôme-Rhône Jupiter ; span, 14·50 m. (open), 5·67 (folded) ; length, 10 m. ; height, 3·85 m. ; wing area, 60 sq. m. ; weight, empty, 1,550 kg. ; fuel load, 300 kg. ; useful load, 850 kg. ; weight, loaded, 2,700 kg. ; max. speed, sea level, 180 km.p.h.

LIORÉ ET OLIVIER

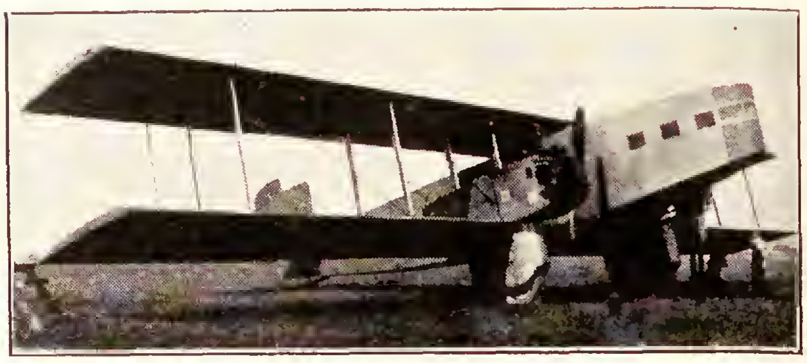
THE *Etablissements Lioré et Olivier* will probably be the only French firm to have a stand devoid of any military aeroplane, their exhibit consisting of a LeO 21 Transport Aeroplane (two 420 h.p. Gnôme-Rhône Jupiter engines) and a LeO H.190 Transport Seaplane (420 h.p. Gnôme-Rhône Jupiter engine). A scale model of the LeO H.15 Transport Seaplane fitted with three Jupiter engines, which took part in the recent commercial seaplane competition at Saint-Raphaël (Var), will also be shown.

The LeO 21 Transport Aeroplane.—The LeO 21 Transport Aeroplane, several of which will shortly be placed on the Paris-London service of the Air Union, is a twin tractor biplane of conventional construction, but of high performance. This machine differs only in its equipment from the LeO 20 three-seater night bomber, which was recently adopted by the French Military Air Service after a competition in which several constructors participated.

The framing of the LeO 21 is of duralumin. The cabin is particularly large and accommodates in a forward compartment six passengers, and in an after compartment twelve passengers. The pilot's cockpit, which is fitted with dual control and wireless telephony and telegraphy, is situated between the two passenger compartments. The freight holds have independent means of access.

Both the tail plane and the vertical fin incorporate an adjustable incidence gear, which may be controlled in flight from the pilot's cockpit, to allow for different trimmings.

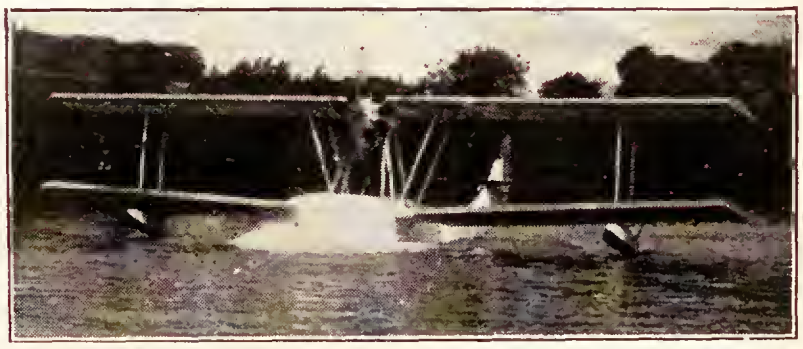
The engine mounting takes either the 420 h.p. Jupiter or the 480 h.p. Renault engines. The engines are started by a Jupiter servo-motor.



The Liore and Olivier LeO 21 commercial aeroplane with two "Jupiter" engines.

Specification.—Engines : two 420 h.p. Gnôme-Rhône Jupiter. Span : 22·76 m. Length : 15·40 m. Height : 4·30 m. Wing area : 106·5 sq. m. Weight, empty : 2,690 kg. Fuel load : 800 kg. Crew : 160 kg. Wireless set : 50 kg. Commercial load : 1,800 kg. Weight, loaded : 5,500 kg. Maximum speed, sea level : 192 km. per hour. Range in still air : 800 km.

The LeO H. 190 Transport Seaplane.—The LeO H. 190 Transport Seaplane is a single-bay tractor biplane flying boat fitted with a 420 h.p. Gnôme-Rhône Jupiter engine. The cabin, fitted forward, accommodates six passengers. Aft of the cabin there is the pilot's cockpit and a wireless room.



The Liore and Olivier LeO H.190 is a transport flying boat fitted with 420 h.p. "Jupiter" engine.

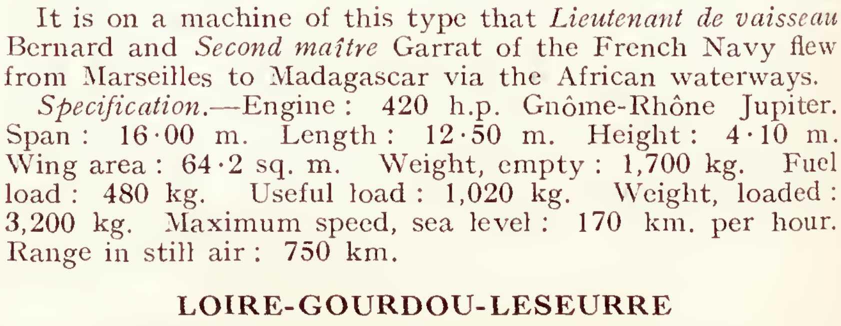
The hull and the wing framing is of timber, and the wings are fabric-covered.

It is on a machine of this type that *Lieutenant de vaisseau* Bernard and *Second maître* Garrat of the French Navy flew from Marseilles to Madagascar via the African waterways.

Specification.—Engine : 420 h.p. Gnôme-Rhône Jupiter. Span : 16·00 m. Length : 12·50 m. Height : 4·10 m. Wing area : 64·2 sq. m. Weight, empty : 1,700 kg. Fuel load : 480 kg. Useful load : 1,020 kg. Weight, loaded : 3,200 kg. Maximum speed, sea level : 170 km. per hour. Range in still air : 750 km.

LOIRE-GOURDOU-LESEURRE

THE aeroplanes produced under the above firm name, which is as a rule abbreviated into "L.G.L.," result from an arrangement whereby the aeronautical design office of Messrs. Gourdou and Leseurre became, in 1925, the aircraft engineering department of the *Ateliers et Chantiers de la Loire*

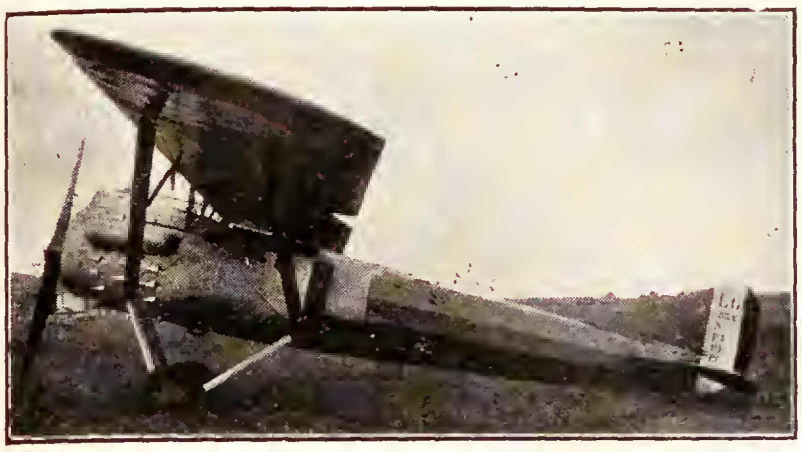


THE L.G.L. 32 C.1, with Bristol "Jupiter" engine, is a single-seater fighter of the parasol monoplane type.

R. M. KINDERMAN
COLLECTION

of Saint-Nazaire, one of the biggest shipbuilding firms of France.

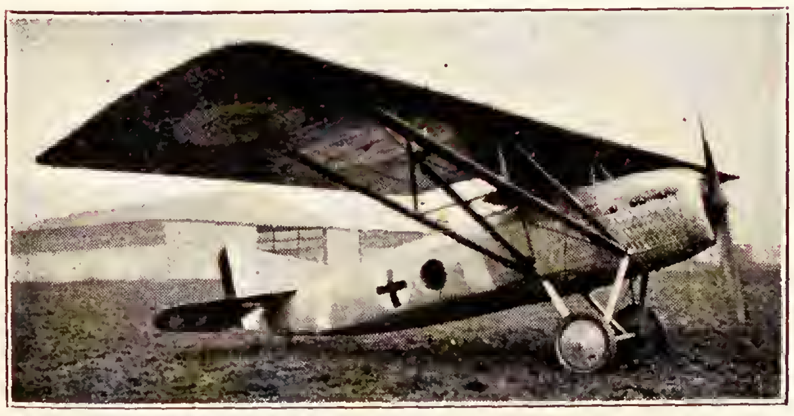
The L.G.L. exhibit at the Salon will consist of two single-seater fighters, type 32 C.1 (420 h.p. Gnôme-Rhône Jupiter) and type 33 C.1 (450 h.p. Lorraine-Dietrich), and of an ambulance aeroplane, type 23 T.S. (180 h.p. Hispano-Suiza).



THE L.G.L. 33 C.1, with 450 h.p. Lorraine-Dietrich, is similar to the 32 C 1, except for the water-cooled engine.

Specification of the L.G.L. 32 C. 1 and 33 C. 1 Single-Seater Fighters

Type	32 C.1	33 C. 1
Engine	420 h.p. G-R Jupiter	450 h.p. Lorraine
Span	12·200 m.	12·20 m.
Length	7.55 m.	8·03 m.
Height	2·95 m.	2·95 m.
Wing area	25 sq. m.	25 sq. m.
Weight, empty	963 kg.	1,139 kg.
Petrol	252 kg.	226 kg.
Oil	33 kg.	18 kg.
Military load	280 kg.	165 kg.
Weight, loaded	1,370 kg.	1,548 kg.
Range	2 hrs. 30 m.	3 hrs.
Safety factor	12	11
	km.p.h.	km.p.h.
Max. speed, sea level	250	250
,, 3,000 m.	245	245
,, 5,000 m.	240	237
,, 6,000 m.	235	220
,, 7,000 m.	230	200
,, 8,000 m.	210	—
Ceiling	9,750 m.	8,500 m.
Climb to 2,000 m.	3 m. 5 s.	3 m. 5 s.
,, 5,000 m.	12 m.	15 m.
,, 7,000 m.	—	31 m.
,, 8,000 m.	31 m.	—
Landing speed	90 km.p.h.	90 km.p.h.
Landing run	150 m.	150 m.
Unstick run	80 m.	80 m.



THE L.G.L. 23 TS, with 180 h.p. Hispano engine, is an ambulance 'plane.

Except for their different power plant and the resulting difference in weights and performance, the two single-seater fighters are absolutely identical in construction and dimensions. The framing of these machines is a composite structure, metal being used for the stress-bearing members and wood for the secondary elements, such as ribs, fairing pieces, etc. The wings are built up on duralumin spars, with wooden ribs; the fuselage has a framing of welded steel tubes. Both the wings and the fuselage are covered with fabric.

These two machines were constructed to satisfy the latest requirements of the French Military Aviation Service, the importance attached to each point being in the order named: (1) armament; (2) ceiling and rate of climb; (3) horizontal speed, and (4) manœuvrability.

The armament of the L.G.L. single-seater fighters consists of two synchronised (Vickers or Darne) machine guns and of two Darne machine guns fixed on the wing and firing above the propeller. The mounting of the wing guns has been designed with particular care to protect the wing structure against vibrations from the guns when they are in action.

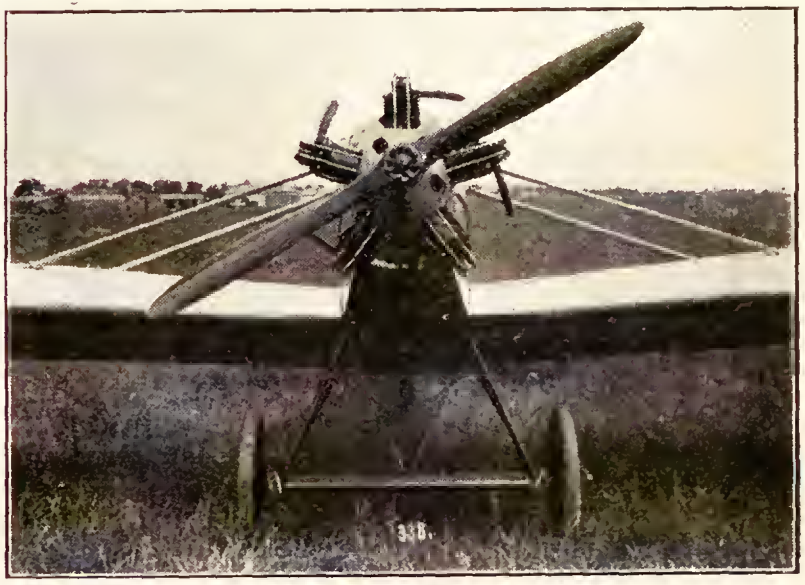
The L.G.L. type 23 T.S. ambulance aeroplane resembles in its essential points the single-seater fighters above mentioned. The cabin accommodates one service stretcher, and contains a complete first-aid equipment, including an oxygen inhalator. The cabin is electrically heated.

Specification of the L.G.L. 23 T.S. Ambulance Aeroplane

Engine, 180 h.p. Hispano-Suiza; span, 11·00 m.; length, 6·90 m.; height, 2·60 m.; wing area, 22·5 sq. m.; weight empty, 700 kg.; weight, loaded, 970 kg.; maximum speed, 180 km.p.h.; climb, 500 m. in 2 min. 20 secs.; 1,000 m. in 5 min.; 3,000 m. in 19 min. Range, 2½ hrs.

MILOS BONDY A SPOL

This well-known Czecholovak firm is exhibiting two aeroplanes, the little Avia B.H. 11 with Walter engine, and a two-seater fighter, the Avia B.H. 26.

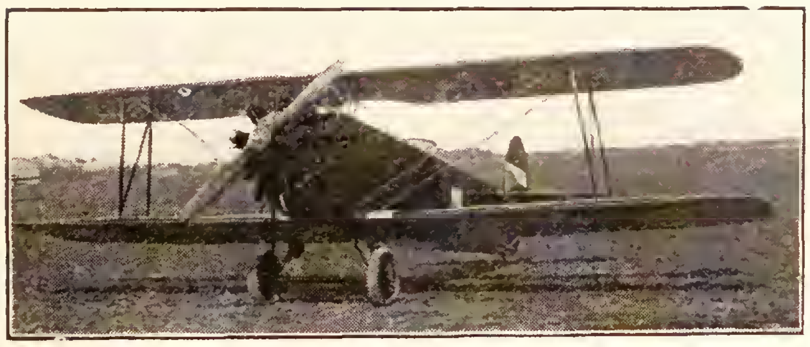


THE AVIA B.H.11, with Walter engine, is the winner of a number of competitions, most recently that for the "Coppa d'Italia."

The Avia B.H.11 is already well known to our readers, and a detailed description is not, therefore, required. The machine is used extensively in the Czecho-Slovakian Army for training purposes. The engine is a 60 h.p. Walter radial air-cooled. Following are the main particulars and performances of the Avia B.H.11:—Wing span, 9·72 m.; length overall, 6·64 m.; wing area, 13·6 sq. m.; weight of machine empty, 352 kg.; useful load, 228 kg.; total loaded weight, 580 kg. Top speed, 160 km./hr.; low speed, 75 km./hr.; landing speed, 65 km./hr. Climb to 2,000 m. in 12 mins. Ceiling, 4,000 m.

The *Avia B. H.*26 two-seater fighter is fitted with a "Jupiter" engine and is a biplane of normal design, with a single bay in the wing cellule and "N" interplane struts. The top plane is, however, of slightly smaller span than the bottom. The wing construction is normal, with box spars and wood ribs. The covering is three-ply wood up to the rear spar, the whole afterwards fabric-covered. The ailerons are of welded steel-tube construction and are fitted to the lower plane only.

The fuselage is of the ply-wood covered box type, without internal bracing wires. The pilot's cockpit is in front, and is equipped with all the usual instruments, as well as with two fixed Vickers guns firing through the propeller, while the gunner has the usual gun ring for his two Lewis guns. Space is provided for 600 rounds of ammunition for the Vickers guns and 1,000 rounds for the Lewis guns. The main petrol tank is inside the fuselage, between the fireproof bulkhead and the pilot's cockpit.



THE AVIA B.H. 26 two-seater fighter has a "Jupiter" engine.

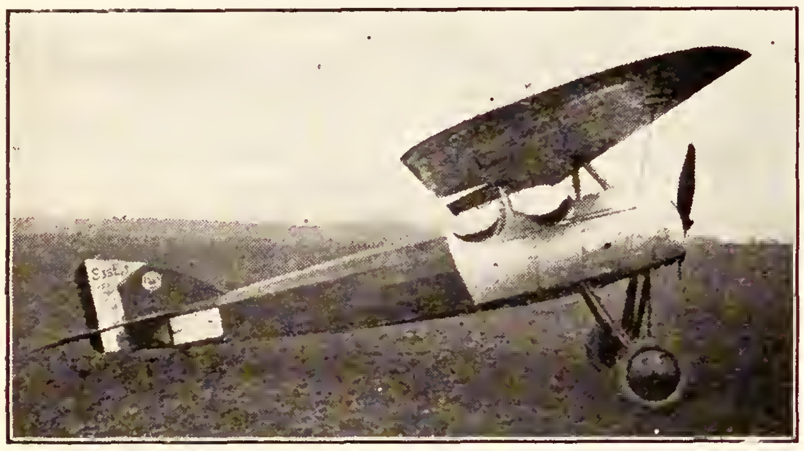
The undercarriage is of the Vee type, the rear legs being telescopic and fitted with rubber blocks working in compression.

Specification of Avia B.H.26.—Wing span bottom plane, 10·8 m.; top plane, 10·2 m.; length overall, 8·78 m.; wing area, 31·32 sq. m.; weight of machine empty, 1,060 kg.; fuel and oil, 220 kg.; crew and equipment, 420 kg.; total loaded weight, 1,700 kg.; duration, 2 hrs. Top speed, 240 km./hr.; stalling speed, 90 km./hr. Climb to 5,000 m. in 20 mins. Ceiling, 7,000 m.

MORANE SAULNIER.

THIS veteran firm of aircraft builders, which originated the parasol monoplane type—a type that enjoys today great popularity among French constructors, as will be seen from the exhibits of the *Salon*—will exhibit three machines.

The first of these is the Morane-Saulnier type 35 E.P.2 elementary training aeroplane, with 80 h.p. Le Rhône engine (the letters E.P. stand for *école primaire*); the second is a type 129 E.T.2 (180 h.p. Hispano-Suiza) advanced training aeroplane (the letters E.T. meaning *école de transition*); the third machine is the type 132, with 120 h.p. Salmson air-cooled engine, which is mainly intended for touring purposes, but may also be used for training work.



THE MORANE-SAULNIER E.P.2, with 80 h.p. le Rhone, is an elementary training machine.

The 35 E.P.2 elementary training machine, of which large numbers exist in the French and foreign military air services, is too well known to require more than a brief mention. The framing of the wings is of timber, except for the spars, which are duralumin tubes. The fuselage has wooden longerons and plywood formers. Both the wings and the fuselage are fabric-covered. The undercarriage struts are steel tubes.

Special care has been taken to make the controls highly responsive and so enable the instructor to impart to his pupil good flying manners; with this end in view the pivoted portions of the controls are mounted on ball bearings, thus insuring great smoothness of action. The tail skid is steerable.

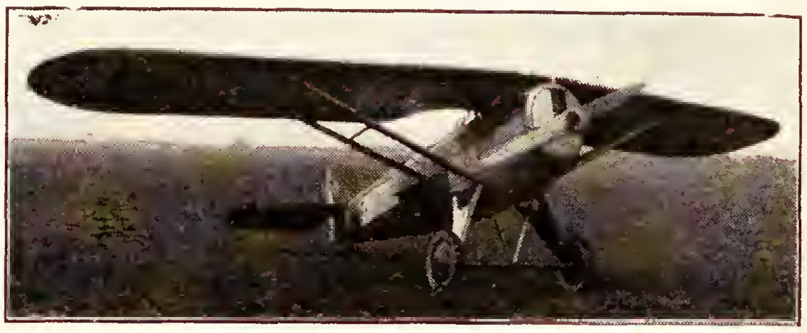
The normal equipment includes a fire extinguisher and parachutes for the two occupants.

Morane-Saulnier Type 129 *E.T.2 Aeroplane*

The Morane-Saulnier type 129 E.T.2 advanced training aeroplane is a strut-braced parasol monoplane which incorporates a particularly complete system of safety features, among which may be mentioned a droppable petrol tank, fire extinguishers, back or seat type parachutes and a self-starter. Special attention has been paid, furthermore, to making the pupil feel comfortable on board; for the purpose the seats are adjustable in height and the rudder bar may be adjusted for distance from the seat.

Constructionally the 129 E.T.2 follows the practice of the 35 E.P.2, that is, the machine is timber-built throughout except for the wing spars which are duraluminium tubes, and the undercarriage struts which are steel tubes. The engine unit, which is mounted on duralumin tubes, is detachable by undoing a few bolts.

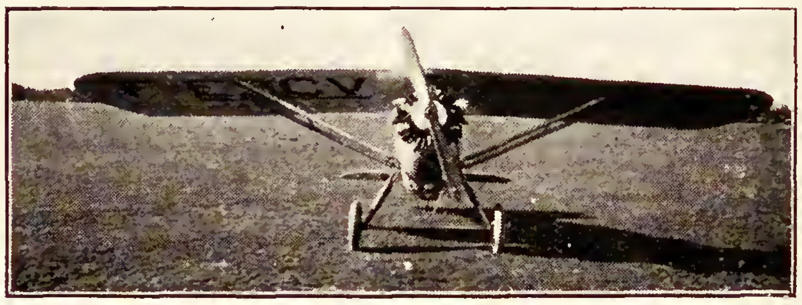
The vast experience which the Morane-Saulnier firm has accumulated in the long years its training school has been in existence at Villacoublay may be said to have taken body in the type 129 E.T.2, a machine so proportioned as to let the pupil do all the mistakes he can so he may realize their gravity, but with a sufficient tendency to inherent stability so the machine will "forgive the mistake."



THE MORANE-SAULNIER 129 E.T.2, with 180 Hispano, is an advance training aeroplane.

Morane-Saulnier Type 132 *Touring Aeroplane.*

This machine is essentially an adaptation of the above described advanced training aeroplane to the requirements of *grand tourisme*, or distant touring. Both machines are constructionally identical, and have the same wing area (19·7 sq. m.), but the touring type is equipped with a 120 h.p. Salmson air-cooled radial engine instead of with a 180 h.p. Hispano-Suiza.



THE MORANE-SAULNIER 132, with 120 h.p. Salmson, is designed as a touring machine.

The type 132 incorporates all the safety features and practical points which have been noted above in connection with the advanced training type of aeroplane.

Specifications of Morane-Saulnier Aeroplanes.

Type ..	35 E.P.2.	129 E.T.2.	132
Engine ..	80 h.p. Rhône.	180 h.p. Hispano.	120h.p. Salmson.
Span ..	10·56 m.	10·70 m.	10·70 m.
Length ..	6·76 m.	7·04 m.	6·86 m.
Height ..	3·60 m.	2·71 m.	2·72 m.
Wing chord	1·80 m.	2·00 m.	2·00 m.
Wing area ..	18 sq. m.	19·7 sq. m.	19·7 sq. m.
Wt., empty	450 kg.	740 kg.	655 kg.
Wt., loaded	700 kg.	1,045 kg.	930 kg.

ATELIERS DES MUREAUX

THE *Ateliers des Mureaux*, of Les Mureaux (Seine-et-Oise), will have at its stand in the *Salon* a Mureaux "Express Marin" single-seater fighter with 420 h.p. Gnôme-Rhône engine, and one of the military aeroplanes the company is building under sub-contract for the French Military Air Service, probably a Bréguet 19.A.2.

The Mureaux "Express Marin" is a tractor parasol monoplane of the strut-braced type, which is fitted with a watertight stepped hull for alighting on the sea. To facilitate this manœuvre the nose of the fuselage is flared out into wing-root like excrescences (there being no wing-tip floats), which contribute to the buoyancy and hydrodynamic stability of the machine. Besides, the undercarriage can be dropped by the pilot.

PALMER

Palmer Landing Wheels and Tyres

were fitted to every British Aeroplane which left England during the Great War, they have been used as standard equipment on British Aeroplanes ever since.

Palmer Cord Aero Tyres and Rims are constructed on entirely different lines from any existing Aero, Car, or Cycle Tyre and Rim.

Although exceedingly light in weight, they are built to carry heavy loads and to withstand enormous lateral stress; tyres, rims and wheels being specially designed in order to fully and adequately resist all the severe and extraordinary strains to which the under carriage of an aeroplane is liable to be subjected.

Palmer Wheels are fitted with floating bushes, which are interchangeable, and grease gun equipment is now a standard fitting on all sizes.

Palmer Wheels and tyres are made in twenty different sizes, from 375 x 55 to 1,750 x 350, constituting a range amply covering the requirements of every type of machine.

Les Roues et Pneus D'Atterrissage Palmer

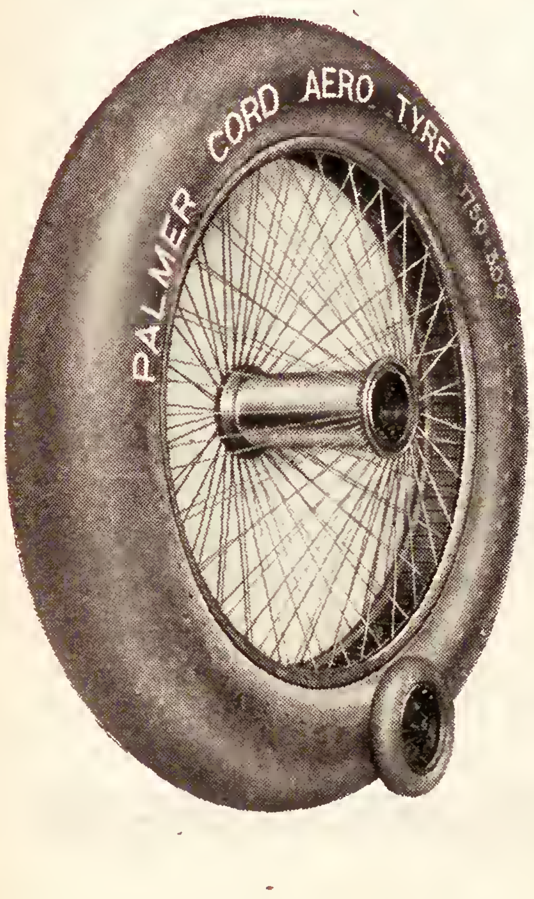
ont été montés sur tous les Avions Britanniques qui ont quitté l'Angleterre pendant la Grande Guerre, et, depuis cette époque ils sont adoptés sur les Avions Britanniques comme équipement standard.

Les pneus à cordes et les jantes Palmer pour Avions diffèrent totalement au point de vue construction de tous les autres pneus et jantes pour Aéro, Auto ou Vélo, actuellement sur le marché.

Malgré leur extrême légèreté, ils peuvent porter des poids considérables et aussi résister à de très gros efforts latéraux. Les pneus, les jantes et les roues sont construits en vue de supporter tous les chocs et toutes les torsions auxquels le train d'atterrissage d'un avion est appelé à étre sujet.

Les roues Palmer sont montées avec des coussinets amovibles et interchangeables, et le graissage sous pression est adapté à toutes les dimensions.

Les Pneus et Roues Palmer pour Avions sont fabriqués dans une série de vingt dimensions différentes (de 375 x 55 à 1,750 x 350) répondant amplement aux besoins de chaque type d'aéroplane.



The smaller of these wheels is only 12″ in diameter, while the larger is taller than the height of the average man.

La plus petite de ces roues est de 30 c/m de diamètre seulement, tandis que l'autre dépasse hauteur d'homme.

Palmer Aero Wheel with broad tread pattern tyre specially designed to facilitate landing on soft ground.
This type was largely used during the war and was highly praised by Sir Alan Cobham on the occasion of his flight from London to Rangoon and return in 1925.

Roue Palmer montée d'un pneu avec chape plate, construit spécialement pour permettre l'atterrissage sur terrain mou. Ce pneu a été beaucoup employé pendant la Guerre, et a reçu de hautes éloges de Sir Alan Cobham à l'occasion de son vol de Londres à Rangoon et retour en 1925.

The Palmer Tyre, Ltd.,

100-106, CANNON STREET, LONDON, E.C.4.

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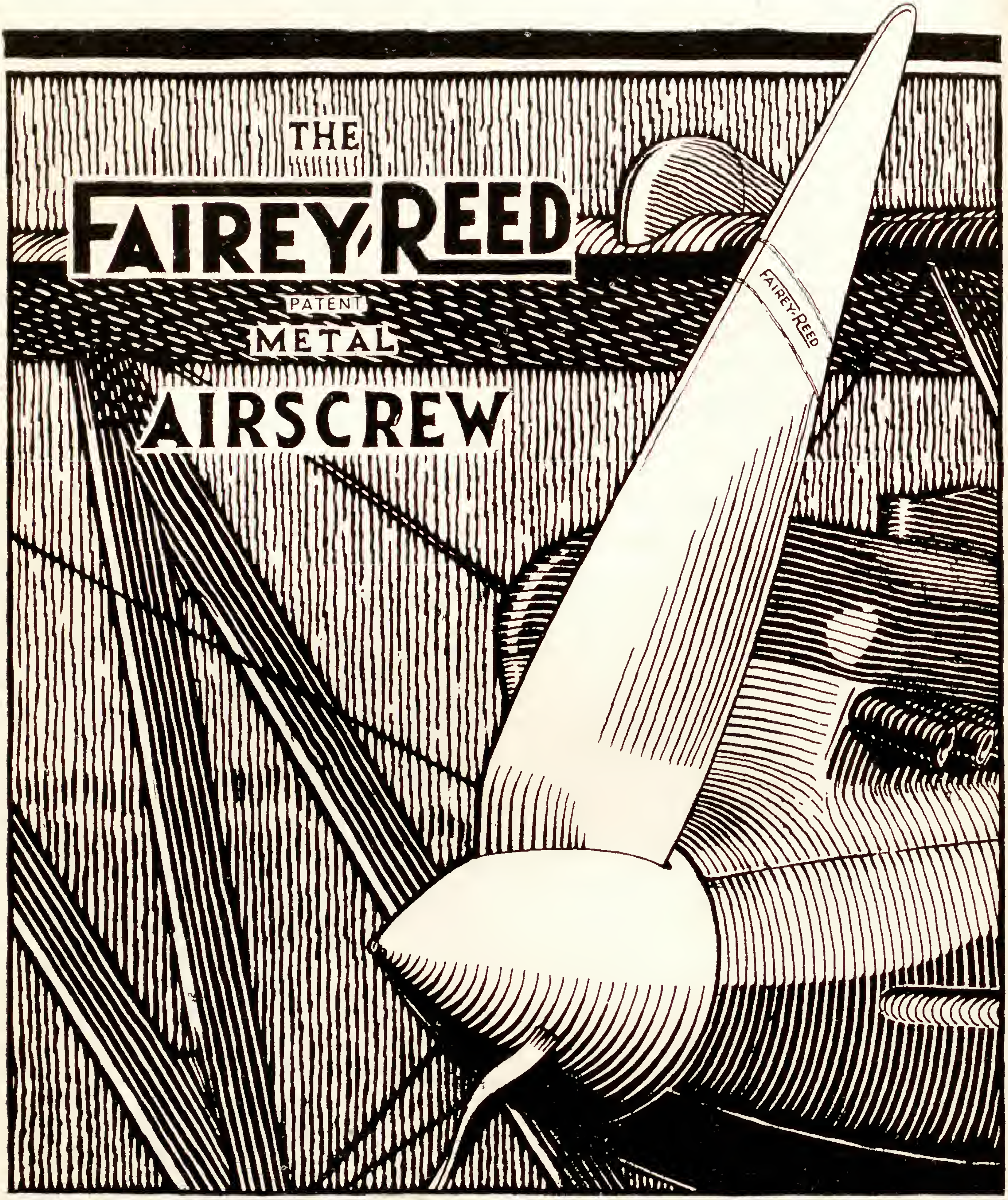

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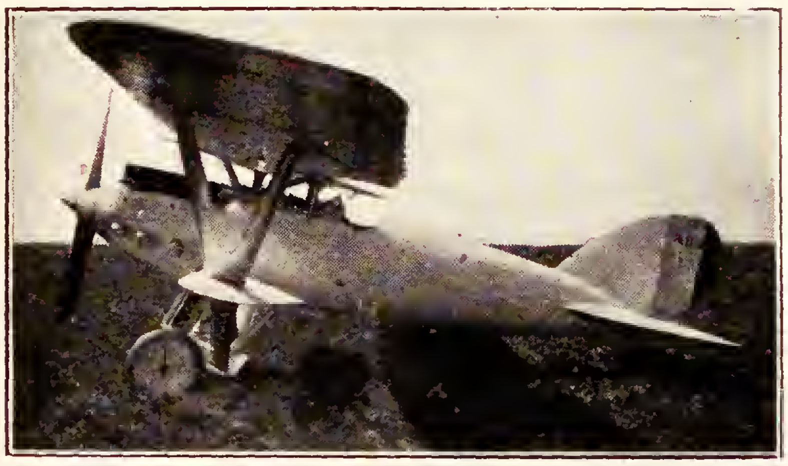
NIEUPORT-ASTRA.

The Nieuport-Astra Company, which originated in 1915 the single-seater fighter type of military aeroplane with its *Bébé Nieuport*, is the largest purveyor of fighting machines to the French Military Air Service, where the majority of *escadrilles de chasse* are equipped with the Nieuport 29 C.1 type (300 h.p. Hispano-Suiza). The replacement of this type by a more powerful machine caused the French Under-Secretariat of Aeronautics to hold in 1924 and 1925 a competition for single-seater fighters, as a result of which orders were let to several manufacturers, including the Nieuport-Astra Company Loire-Gourdou-Leseurre, and Michel Wibault.

The Nieuport-Delage fighter adopted by the French Military Air Service, type 42 C.1 (500 h.p. Hispano-Suiza), will be exhibited at the *Salon de l'Aviation*, as will be a new category of military aeroplane, called a "light fighter," in the form of type 48 C.1 (400 h.p. Hispano-Suiza). The principal military difference between the two types is that the light fighter only carries two synchronised machine guns, whereas the heavy fighter mounts two wing guns besides.

Constructionally the two types are almost identical. The fuselage is of the monocoque type, and is built in two halves, split along the horizontal, of strips of glued tulip wood and spruce longerons. In the forward portion the fuselage is reinforced by a framing of riveted sheet duralumin which is bolted to the monocoque skin. This framing gives the machine great rigidity and resistance against torsional stresses, for it not only serves as the engine mounting, but also forms the central structure to which the upper wing and the undercarriage are fixed. The framing extends as far back as the pilot's cockpit.

The top wing has duralumin box spars and plywood ribs, while the bottom winglet is entirely timber-built. The axle fairing is in the shape of an aerofoil, and thus contributes to the sustentation. The top wing is braced to the undercarriage by means of Y-type struts. In the type 48 C.1 there is no bottom winglet. The wing bracing struts as well as the undercarriage struts are built of riveted sheet duralumin. The cabane struts are duralumin tubes.



THE NIEUPORT-DELAGE 42 C.1 single-seater fighter with 500 h.p. Hispano engine.

Specification of Nieuport-Delage 42 C.A. Fighter Aeroplane

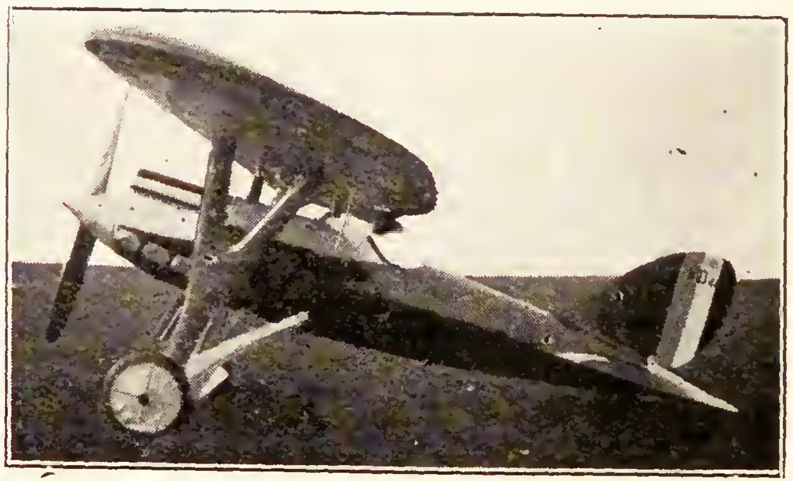
Engine, 500 h.p. Hispano-Suiza; span, 12·00 m.; length, 7·50 m.; height, 3·00 m.; area, top wing, 25·25 sq. m.; area, bottom wing, 4·25 sq. m.; area, axle fairing, 1·75 sq. m.; total wing area, 31·75 sq. m.; weight, equipped, 1,379 kgs.; fuel load (for 2 hours), 268 kgs.; disposable load, 161 kgs.; weight-loaded, 1,808 kgs.

Official Performances (S.T.Aé.)

Altitude. Metres.	Climbing Time. Mins.	Secs.	Maximum Speed. Km. p.h.
1,000	2	6	266·5
2,000	4	1	266·5
3,000	6	15	266·3
4,000	9	13	265·3
5,000	13	3	262·3
6,000	18	12	251·5
7,000	25	31	238·0

Ceiling, 8,000 m.; unstick run, 106 m.; landing run, 150 m.; safety factor, 15.

The disposable load includes 2,000 rounds of ammunition for the four guns, as well as signalling apparatus. The weight equipped includes all the non-dischargable weights which form the standard equipment of French fighting aeroplanes, namely, instruments, machine guns, gun sights, heating apparatus, parachute, fire extinguisher, self-starter, oxygen inhalator, 64 litres of water and 42 kgs. of protective material for the fuel tanks.



THE NIEUPORT-DELAGE 48 C.1 is of the type now known in France as a "Light Fighter." The engine is a 400 h.p. Hispano.

Specification of the Nieuport-Delage 48 C.1 Light Fighter

Engine, 400 h.p. Hispano-Suiza; span, 10.00 m.; length, 6·40 m.; height, 2·78 m.; wing area, 18·38 sq. m.; axle fairing area, 1 sq. m.; total supporting area, 19·38 sq. m.; weight equipped (empty), 1,032 kgs.; disposable load, 98 kgs.; fuel load (1½ hours), 160 kgs.; weight, loaded, 1,290 kgs.

Official Performances (S.T.Aé. Tests)

Altitude. Metres.	Climbing Time. Mins.	Secs.	Maximum Speed. Km. p.h.
1,000	2	14	275
2,000	4	21	272
3,000	6	54	269
4,000	10	39	263
4,500	13	12	—
5,000	16	16	255
5,500	20	56	—
6,000	27	24	—
6,500	40	16	—

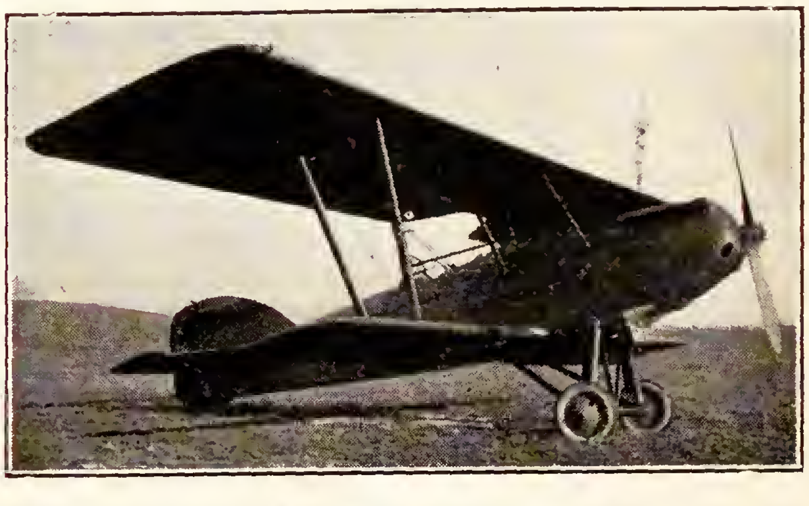
The "weight equipped" does not include any heating apparatus or oxygen inhalator, as they are not deemed necessary at the altitudes at which this machine will be called upon to perform.

The disposable load includes the weight of the pilot and that of 700 rounds of ammunition.

POTEZ

The Henri Potez firm is one of the two principal purveyors of corps observation (or army co-operation) aeroplanes, that is, medium bomber-fighter two-seaters to the military air services of France and the countries of the Little Entente, Czechoslovakia excepted. Potez two-seaters have also been furnished in series to Denmark, Esthonia, Japan, Spain and Portugal.

Visitors to the *Salon de l'Aéronautique* will see this year the latest type of corps observation aeroplanes produced by Henri Potez, that is, type 25 A.2—which is the "opposite number" to the Bréguet 19 A.2, just as the Potez 15 A.2 was

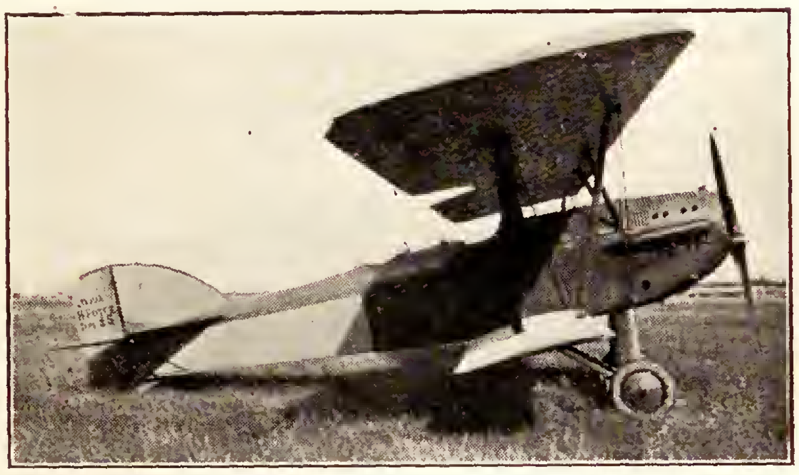


THE POTEZ 25 A.2 with 450 h.p. Hispano engine, is an army co-operation biplane of recent design.

the opposite number to the Bréguet 14 A 2. In addition, the Potez Company will exhibit two aeroplanes of a type which is designated in France under the letters G.R., meaning, indifferently, *grand raid* or *grande reconnaissance* (distant cruise or distant reconnaissance, respectively). One will be the 25 G.R. with 450 h.p. Lorraine-Dietrich engine, on which Capt. Pelletier Doisy and Lieut. Gonin covered last summer a circuit of the Mediterranean (Paris-Rome-Tunis-Casablanca-Madrid-Paris) of 6,500 kms. in 41 hrs. 40 mins. elapsed time, involving night flying from Tunis to Casablanca. The same machine was used by Capt. Arrachart and Engineer Carol on the high-speed circuit of the European capitals in August, 1925, when they covered a distance of 8,000 kms. in less than three days. The other *grand raid* machine exhibited on the Potez stand will be the type 28, with 550 h.p. Renault geared-down engine, on which the Arrachart brothers established a world's straight-line distance record by flying from Paris to Basrah, on the Persian Gulf, last June (4,313 kms. in 26 hrs. 30 mins.).

Potez 25 A.2 Observation Aeroplane

The Potez 25 A.2 observation aeroplane is a tractor biplane characterised by a very large top wing and a small bottom wing, thus affording the occupants a maximum of vision. The wings have a framing of timber and plywood; the cabane struts and the interplane struts are faired steel tubes. The fuselage comprises structurally three sections: the forward section consists of an interchangeable engine mounting of riveted-sheet duralumin, which is secured with four bolts to the central portion of the fuselage; the latter covers the entire habitable portion of the machine and is built up of spruce longerons and cross-pieces, with plywood covering. The rear portion of the fuselage is similarly built, except that the plywood covering is replaced by wire bracing and fabric covering.



THE POTEZ 25 G.R. with 450 h.p. Lorraine engine, is a long-distance reconnaissance biplane.

The interchangeable engine mounting takes indifferently any power plant of from 400 to 500 h.p. So far, the following engines have been mounted on the Potez 25 A.2: 450 h.p. Lorraine-Dietrich, 420 h.p. Gnôme-Rhône Jupiter, 450 h.p. Hispano-Suiza, 480 h.p. Renault and 500 h.p. Farman.

The undercarriage is built of duralumin tubes, with a divided axle; rubber discs enclosed in the outer front struts serve as shock-absorbers.

The Potez 25 A.2 is normally armed with four machine guns, one of these being synchronised with the engine, two being mounted on a gun ring and the fourth being fixed on the floor of the rear cockpit for firing under the tail through a trap door. According to the type of bomb rack employed, the machine may carry either twelve 10 kg. bombs inside the fuselage or else sixteen or twenty-four 10 kg. bombs on the lower wings.

If it is desired to use this machine for distant reconnaissance work, the bomb load is eliminated, but an additional machine gun is mounted in synchronisation with the engine and the ammunition supply of all the guns is doubled.

The Potez G.R. Distant-Cruise Aeroplanes

The Potez 25 G.R. distant-cruise aeroplane is almost identical with the Potez 25 A.2 observation machine; it only differs from the latter by having supplementary fuel tanks which increase the machine's range to 14 hrs., corresponding in still air, at a cruising speed of 180 k.p.h., to a distance of 2,500 km. Of course, the G.R. machine does not carry any armament, at any rate, not during record attempts.

THE POTEZ 28 G.R. has a 550 h.p. Renault geared engine.

The Potez 28 G.R. aeroplane of Paris-Basrah fame is very similar in construction to the above-named types, except that the fuselage framing is reinforced to carry the huge supplementary fuel tanks which are fixed to the underside of the fuselage and which give the machine a range of approximately 5,000 km. in still air.

While the Potez 28 G.R. is normally equipped with the 550 h.p. Renault geared-drive engine, it may also be equipped with the 500 h.p. Farman geared down engine.

Specification of the Potez 25 A.2 Aeroplane

Engine, 450 h.p. Lorraine-Dietrich; span, 14 m.; length, 9 m.; height, 3·50 m.; wing chord, top, 2·50 m.; wing chord, bottom, 1·40 m.; gap, 1·90 m.; wing area, top, 34·10 sq. m.; wing area, bottom, 12·60 sq. m.; wing area, total, 46·70 sq. m.; weight, empty, 1,210 kg.; military load, 500 kg.; fuel load, 288 kg.; weight, loaded, 1,998 kg.

Official Performances in S.T. Aé. Tests

Altitude.	Climbing Time.		Max. speed.
m.	m.	s.	km. p.h.
Sea level			211
1,500	4	55	217
2,000	6	48	216
3,000	10	23	212
4,000	14	45	208
5,000	20	21	200
6,000	29	46	

Ceiling, 7,400 m.

Weights and Performances of the Potez 25 G.R.

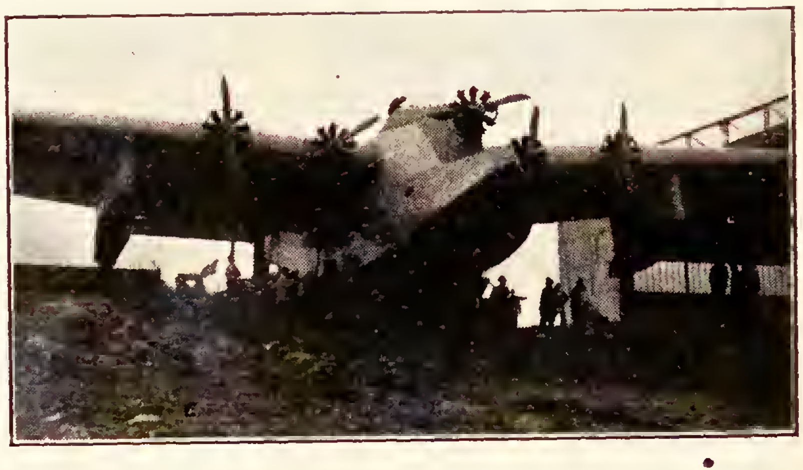
Weight, empty, 1,220 kg.; crew and equipment, 250 kg.; fuel (1,200 litres of petrol and 60 litres of oil), 895 kg.; weight, loaded, 2,365 kg.; ceiling at start, 5,800 m.; maximum speed at half-load, 225 km.p.h.; cruising range, 14 hrs. (2,500 km.).

Specification of the Potez 28 G.R. Aeroplane

Span, 16·20 m.; length, 11 m.; height, 4·10 m.; wing chord, top, 2·90 m.; wing chord, bottom, 1·60 m.; wing area, top, 46·40 sq. m.; wing area, bottom, 16·60 sq. m.; wing area, total, 63 sq. m.; weight, empty, 1,900 kg.; crew and equipment, 240 kg.; fuel, 2,630 kg. (3,400 litres petrol and 280 litres oil); weight, loaded, 4,770 kg.; maximum speed, with half-load, 210 km. p.h.; ceiling, at start, 2,500 m.; ceiling, with half-load, 5,200 m.

SAINT NAZAIRE PENHOËT

THE *Chantiers et Ateliers de St. Nazaire Penhoët*, one of the largest shipbuilding firms of France, which built the biggest liners of the French Line, such as the *France*, the *Paris* and the new *Ile-de France*, recently instituted an Aeronautical Department, the chief engineer of which is M. Richard.



The Saint-Nazaire "Richard-Penhoët" flying boat is fitted with five "Jupiter" engines. It has a span of 40 m.

BRITISH AIRCRAFT SECTION OF 'FLIGHT'

The BLACKBURN AEROPLANE & MOTOR Co., Ltd.

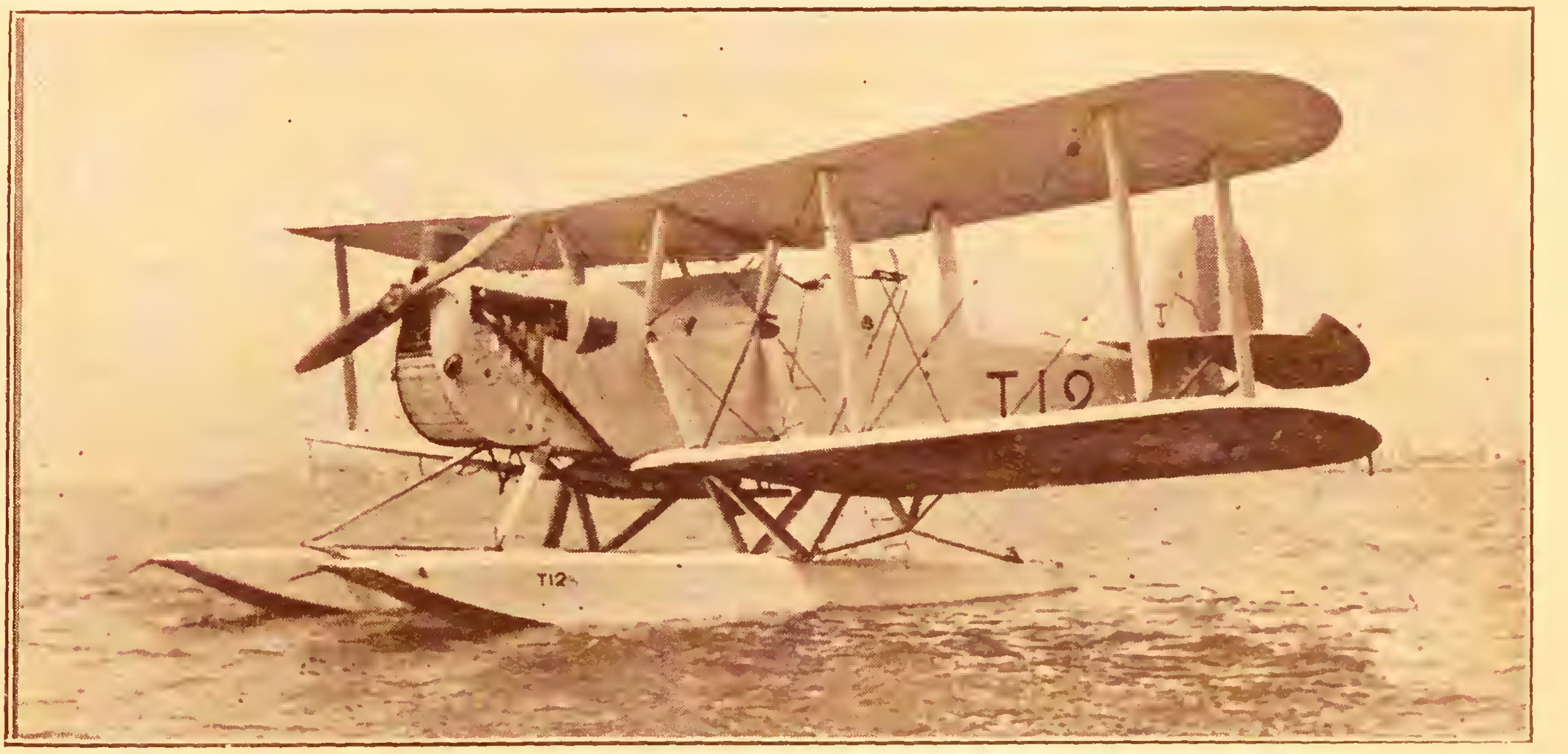
The present company was formed at Olympia, Leeds, in June, 1914, by Mr. Robert Blackburn, one of the pioneers of British aviation, who designed, built, and flew his first aeroplane in 1909. To-day, with Mr. R. Blackburn as managing director, Major F. A. Bumpus as chief designer, and also director, and Major J. D. Rennie as flying boat and seaplane designer, the firm possesses a large up-to-date factory on the old site at Olympia, Leeds, and an additional experimental and erection base, with an aerodrome, extensive hangars and seaplane slipways, at Brough, E. Yorks.

In the early days of the war the company adopted a policy of specialisation in naval types of aircraft, paying particular attention to coastal defence types and especially the development of torpedo-carrying aeroplanes and seaplanes. Adherence to this policy has not only brought about the production of highly efficient aircraft for coastal defence purposes, but also, owing to the exacting nature of the conditions to be met in this type of work, and particularly in the requirements of ship-carried aircraft, has enabled the firm with equal success to extend their activities to cover other types for military purposes and also training and commercial aircraft.

Torpedo Aircraft. Among the post-war Blackburn coastal defence aircraft are many interesting types of torpedo, fleet spotting and reconnaissance aeroplanes, seaplanes and flying boats. Of the more modern types, some of which have lately been added to the Service and others are in construction stages, information is, however, necessarily restricted by secrecy conditions. In 1920 the "Swift" torpedoplane (450 h.p. Napier "Lion" engine) was produced as a single-seater torpedoplane with a land type chassis. This machine was exhibited at the Olympia Show of that year and its value was soon recognised by the British and foreign Governments, the first of this type being acquired by the British Government and subsequent machines by America, Japan, Spain, and other countries. Later, a modified "Swift," known as the "Dart," was adopted as the standard torpedoplane of the British Royal Air Force, and the company had the honour of equipping several squadrons with machines and spares which are giving excellent service to-day.

Both the "Swift" and "Dart" embody a type of construction which has proved ideal for its purpose; these machines are built up on a detachable unit system the main structure being of steel tubes, so that maintenance is simplified, and the facility for effecting repairs and replacements enables machines to be kept in regular service with consequent efficiency and economy. Both types were originally designed as deck-landing machines with land type chassis and folding wings. Incidentally the "Swift" was the first machine with staggered wings designed to fold. Each at first intended to carry an 18-in. torpedo weighing 1,500 lb., or torpedoes of similar size and weight, was then developed to carry an alternative equivalent load of bombs. Then the types were fitted with float chassis so that the capabilities of each were extended to meet the requirements of torpedo or bombing operation either from land, carrier-ship or sea.

A later type developed from the "Swift" and "Dart", is the "Velos," which is now being produced for the Greek



The Blackburn "Velos" (Napier "Lion" Engine).

Government. This type is also fitted with a Napier "Lion" engine, and is a two-seater torpedoplane or bomber, the extra seat being occupied by a gunner with Lewis machine gun or alternatively by a pupil with dual control. It is also a land machine or seaplane, the wheel and float chassis being interchangeable and capable of operation from a carrier ship.

Continuing the developments on a much larger scale, the Blackburn "Cubaroo," with the 1,000 h.p. Napier "Cub" engine, is a heavy torpedo 'plane or bombing machine capable of long-distance operation independently or in co-operation with the Fleet. It is designed to carry a torpedo of 21 ins. diameter, weighing a ton and a half (3,360 lbs.), or an equivalent alternative load of bombs, and is extensively equipped with defensive armament. A further development of the same type is available as a twin-engined machine. Particulars of the "Ripon" torpedoplane, delivered to the Royal Air Force this year, and of other torpedo aircraft now under construction, are not available.

Fleet Spotter and Reconnaissance Types. The "Blackburn" is an example of the firm's Fleet spotting aircraft. This machine embodies many of the constructional details of the "Swift," and "Dart" types, and is also available as a land machine, ship-plane, or seaplane. The floats are fitted with special keels upon which the machine can be landed upon the deck of a ship.

For long-distance reconnaissance work the firm have recently produced a large type of flying-boat, named the "Iris," for the British Air Ministry. Fitted with three Rolls-Royce "Condor" engines of 650 h.p. each, this huge craft is capable of long-range work over sea with almost certain immunity from forced descent, owing to the fact that it is capable of sustained flight with two engines only in action, and of comparatively long distance with gradual loss of height with one engine only.

A Training Machine For training purposes the Blackburn "Sprat" (275 h.p. Rolls-Royce "Falcon" engine) has been produced primarily for deck-landing training. It is not confined to any one branch of training work seeing that it may be used also as a land machine or seaplane, the wheel and float chassis being interchangeable. On account of its wide performance range and general flying qualities, it is proportionately comparable with the majority of present-day service types, and for this reason the firm claim that it may be used with safety and advantage as the only type necessary for preliminary or advanced instruction before the flying of almost any other type.

Civil Aircraft. On a smaller scale the "Bluebird" light aeroplane (60 h.p. Armstrong-Siddeley "Genet" engine) is an example of a practical small aeroplane, either for preliminary training purposes or for the owner-pilot. In this machine the two seats are placed side by side, with the result that flying instruction can be carried out under very favourable conditions, and pleasure flying with a sociability impossible with the usual tandem seating. It should be mentioned that it was a machine of this type which won the Grosvenor Cup race at the Lympne race meeting this year, the Open Handicap race at the Yorkshire Aeroplane Club's Aerial Pageant, and second place in the Open Handicap at the Lancashire Aero Club's race meeting.

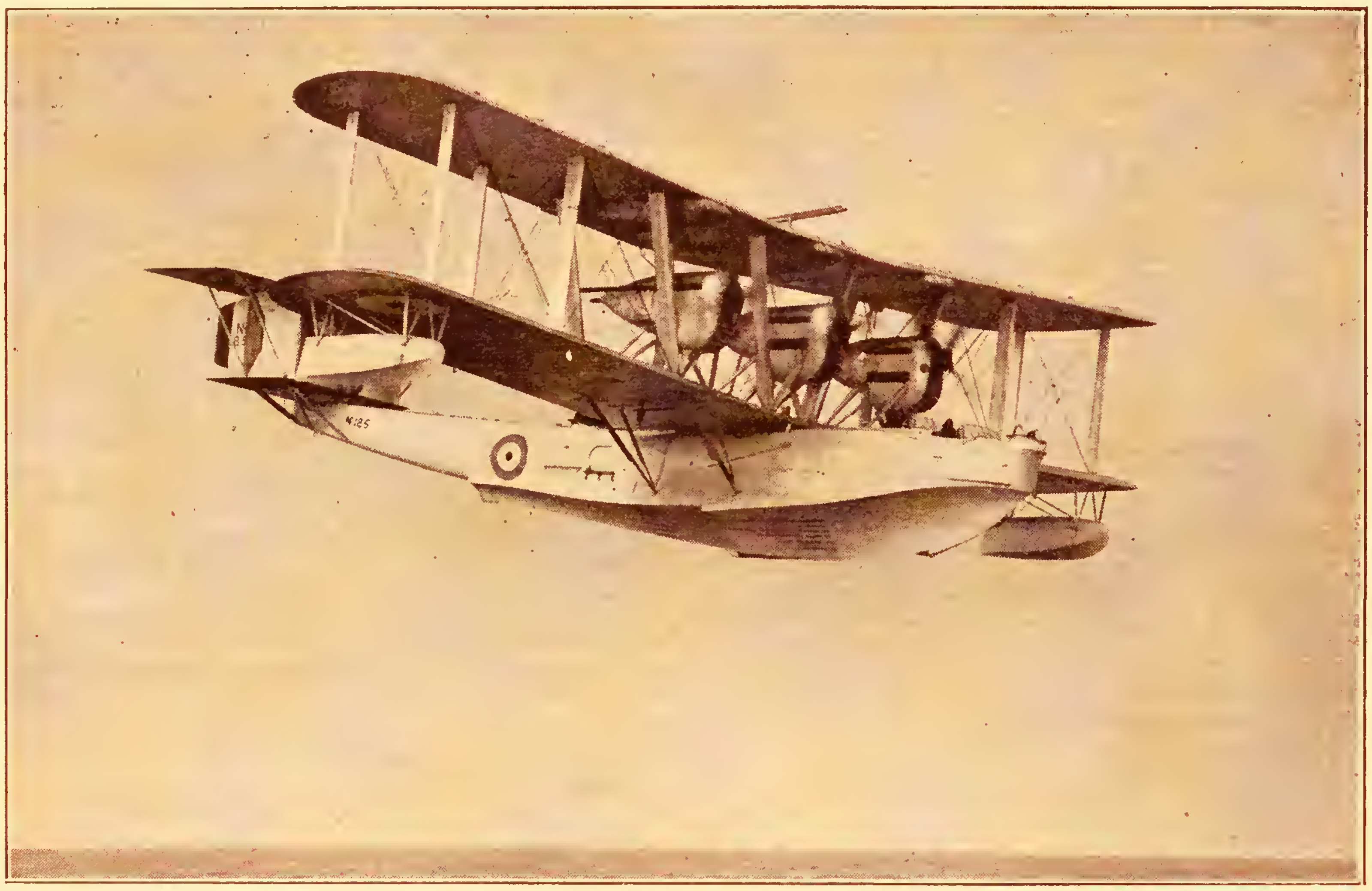
For commercial purposes the firm are developing a single-engined four-seater as a type of land or sea taxi-plane for business or pleasure purposes. Design work for long-distance passenger and goods multi-engined aeroplanes and flying-boats is also in hand.

Practical Aviation. Subsidiary to the Blackburn Co. is a company known as North Sea Aerial and General Transport, Ltd. For the last three years this company has been operating a flying school at Brough, near Hull, where both land and sea flying training is undertaken, the former from the company's aerodrome, which is along the banks of the Humber, and the latter from the river itself. An expert staff of instructors and engineers is maintained, and Blackburn training types are operated with continuous success, over a hundred and twenty officers of the Royal Air Force Reserve passing through the school yearly on their annual flying courses. This company is also prospecting for commercial air transport routes in various parts of the British Empire, and has almost completed the final arrangements for the commencement of a commercial seaplane service in Africa.

The North Sea Co. not only undertakes flying training work in connection with the R.A.F. Reserve, but is also prepared to teach British or foreign officers or civilians, and to give a thorough grounding in technical subjects connected with aviation, in navigation, meteorology, maintenance of aircraft, and practical work in the shops.

Foreign Work. The company's work abroad is also of interest. In addition to supplying foreign governments with aircraft, the company, in the case of Greece, has sent out an expert staff to organise the government aircraft factory at Phaleron, near Athens, and to supervise the construction of Blackburn torpedo 'planes for the Greek Naval Air Service.

The company's head office is Olympia, Leeds.



["Flight" *Photograph*

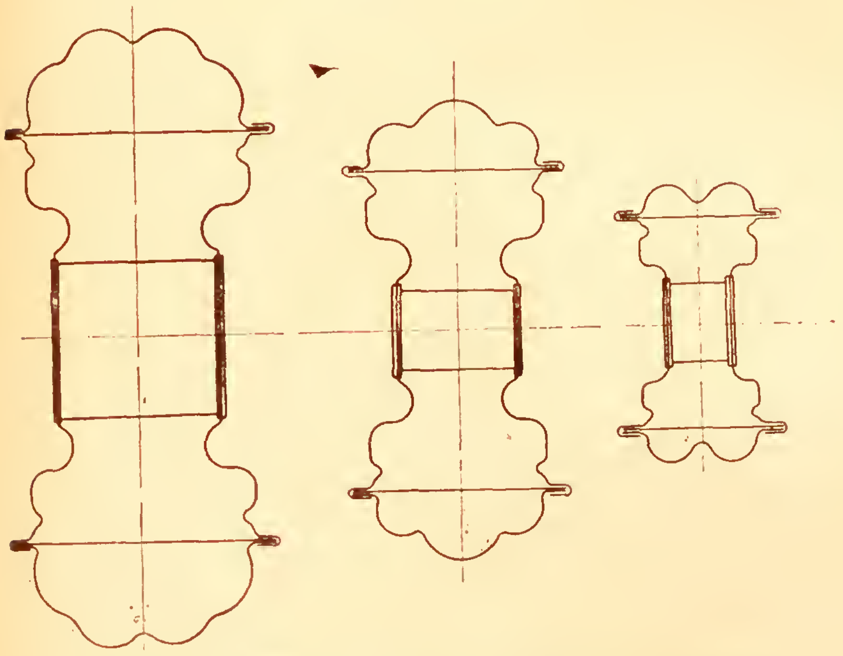
The Blackburn "Iris" 3 Rolls-Royce Condor Engines.

BOULTON & PAUL Ltd.

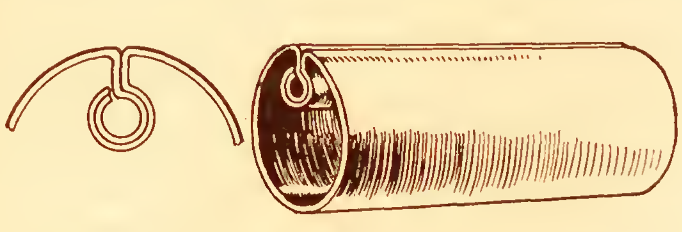
OUR readers are already well acquainted with the part which Boulton & Paul, Ltd., have played in the development of metal construction for aeroplanes, and we have, from time to time, published descriptions of various machines produced by them, in which particulars of the earlier development of the system have been given.

The more recent activities of this company have been devoted, apart from the design of specific aeroplanes, to a general extension of their patented system on a standardised basis, which will ultimately make it directly applicable to aircraft of a very wide range of types.

This object is being achieved by the standardisation of a number of sections which, while providing the widest possible latitude, at the same time strictly limit the number of tools and operations required for assembly and erection. The special plant, tools and skilled and experienced supervision required for the formation of sections are too much to be carried by every firm wishing to engage in metal construction, and for this reason, Boulton & Paul have, at considerable expense, equipped and staffed a special department at their factory to carry out this work for themselves and their licensees. The basic features of Boulton & Paul sections, and the simple method of attaching fittings, are already well known. By the provision of three standard web section forms and six flange section forms, with suitable tools for producing them from strips of varying thickness, a range totalling over 2,000 spars, suitable for use in aeroplanes from 2,000 lbs. to 20,000 lbs. total weight, is available. By suitably combining the various sections, a fine graduation in strength is obtained, and for a given depth of wing, the choice may be made from 18 different spars, the strength characteristics of which are accurately known and tabulated. Special sections for longerons, or drag struts, ribs and other members are similarly graduated, and are supplied normally in lengths up to 70 ft., although if specially required, the length can be increased to 150 ft. These sections include a locked joint tube, which can be manufactured not only in great lengths, but in high-tensile nickel chrome or stainless steels and light alloys, and in very small thickness/diameter ratios, *e.g.*, 2 ins., 26 gauge, in all gauges from 30 gauge upwards.

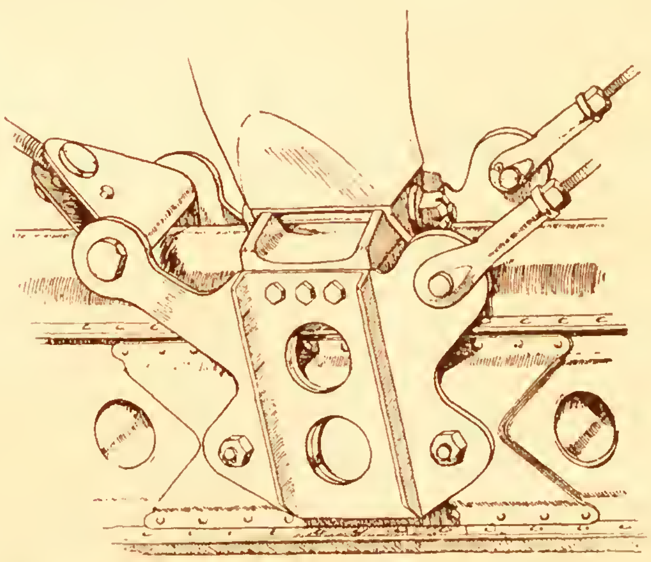


Boulton & Paul's standardised metal sections.



Boulton & Paul's locked joint tube.

The dimensions of all spars are so standardised that the dimensions associated with the joining or riveting are common to all, thus the riveting tools or machines will take the whole range. As only three web sizes are required, three sets of tools will cover all the jigs, etc., and the standardised attachment fittings. Plates for the attachment of fittings are made of high-tensile steel in three standard widths, stamped out at the works to suit the spar selected. It will be seen that the adaptation of the Boulton & Paul system of construction to any normal design of aeroplane is a very simple matter indeed, necessitating very little expense or delay. In addition, it is always possible to order spares or replacements by quoting the number of the section and specification number of the material, with the certainty of obtaining members identical in every respect with those originally supplied.



Boulton & Paul's standardised spar joints.

Another great advantage to the aeroplane builder is the lack of necessity for any elaborate furnace equipment. No heat-treatment whatever is required to be given the material after leaving Boulton & Paul's works, except the ordinary salt bath treatment for light alloys and for the re-tempering of any high-tensile steel fittings which it is necessary to bend.

An important development, without mention of which this review would be incomplete, is in the continuous process by which all Boulton & Paul sections are heat-treated after forming.

The steel strip used in the formation of sections for spars or similar members has hitherto been heat-treated at the steel works and rolled or drawn in the hard state. By heat-treating the strip in coils it has been found impossible to obtain uniformity of treatment, and an extensive series of tests has revealed considerable variations in strength and ductility between different parts of the same roll of strip. This resulted in distortion of sections in forming, and other difficulties, in order to avoid which a special plant has been designed and installed, enabling the strip to be formed in the soft state and heat-treated continuously after passing through the dies. This method guarantees absolute uniformity of treatment throughout the length of a member, and, in addition, careful tests of strength and hardness are made, both before and after forming. A stress-strain diagram is prepared from tensile tests of all incoming materials, and carefully checked. The tests for hardness are made on a Rockwell testing machine, which enables comparative readings to be taken at a number of points along a finished section without damaging the material, and which can be referred to readings which have been taken on samples of a similar material whose properties have been determined from a stress-strain diagram. In this way, all irregularities in material are eliminated. The built-up spars, struts, etc., are tested for strength under various conditions of loading and the results charted and analysed, a complete photographic record being kept of all failures. Thus a wealth of knowledge and experience has been accumulated, which is available for use in design.

The wide experience of Boulton & Paul, Ltd., in metal aircraft design is being utilised in the construction of the new giant airship R 101, and marked increases in the efficiency of girder members have been made, compared with methods of airship construction hitherto employed.

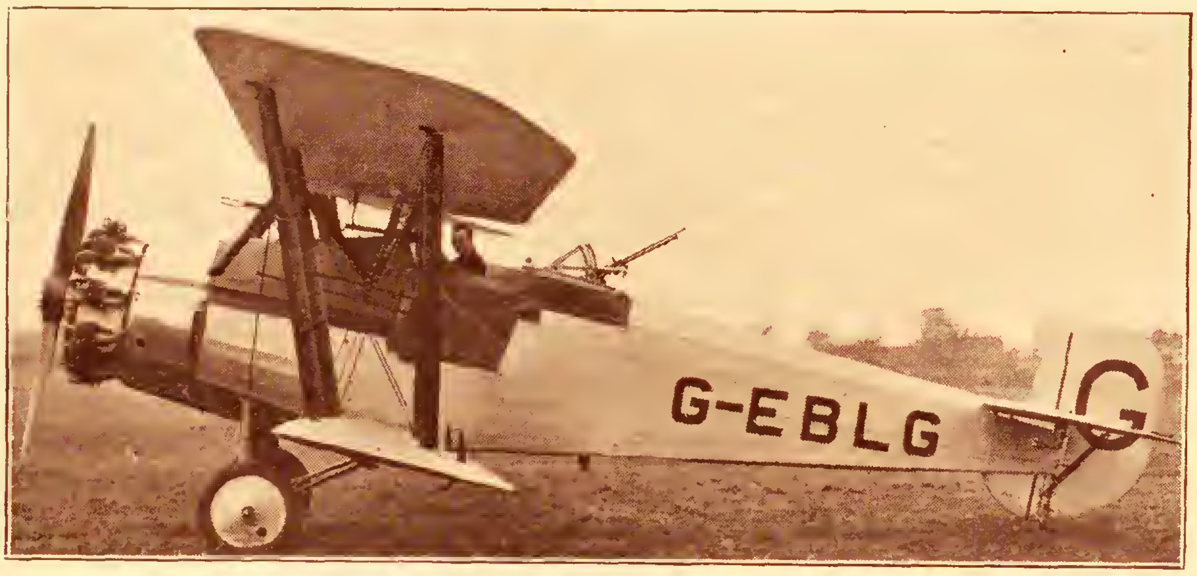
The BRISTOL AEROPLANE Co., Ltd.

WHEREVER "Bristol" aeroplanes are used—and they are in service in most parts of the world—their high standard of quality is recognised. Since "Bristol" aircraft were first seen in flight nearly seventeen years ago, the question of quality has always been kept in the forefront—quality of design, quality of material, quality of workmanship—and it is a rigid adherence to the slogan that "nothing but the best is good enough for a 'Bristol'" that has formed the foundation upon which the very solid reputation of the "Bristol" aeroplanes is based. "Ship-shape and in Bristol fashion" was the measure by which the old Elizabethan sea-dogs judged their craft; "The 'Bristol' fashion" is still the standard by which the modern pilot of the air adjudges quality in an aircraft.

For seventeen years the Bristol Aeroplane Company, Ltd., has held its place in the forefront of aeronautical development. Experimental work on a wide basis is continually in progress and the result of these efforts is embodied in the "Bristol" machines. For some years past, for instance, the Bristol Company have been steadily developing their organisation for the construction of all-metal aircraft, so that to-day not only have they one of the best-equipped departments in the country for this class of work, but they have also developed types of all-metal aircraft which have proved after long flying service to be machines of exceptional efficiency. These have ranged from a small cantilever monoplane of 800 lbs. weight to a type of 8,000 lbs.

The "Bristol" Boarhound.

A good example of "Bristol" all-metal construction is the "Bristol" Boarhound, an efficient biplane for use as a two-seater fighting or reconnaissance machine or as a day bomber. The structure is entirely of metal with the exception of the fabric covering, and 95 per cent. is of steel.



The "Bristol" Boarhound.

Following the general principles which have been developed in "Bristol" all-metal machines, the construction is such that in the event of small local damage, repairs can be carried out rapidly by any average mechanic. In the event of more extensive damage due to bad landings or crashing, the design is such that, for instance, joining by riveting in the wings has been reduced to a minimum so that even should a spar be buckled beyond repair, which in the case of a timber-built machine would entail a total loss, the member may be taken out of the wing and replaced with very little labour. For the same reason, the fuselage is constructed of easily-detachable components.

Especial attention has been devoted in the "Bristol" Boarhound machine to ensuring that both pilot and gunner shall have a wide field of view.

Dual control is provided in this machine with tail actuating gear, and all moving parts are fitted with lubricators. Control surfaces are balanced to give light operation at all speeds and "Bristol"-Frise type ailerons, which have a very small yawing effect, ensure control at stalling speed.

There is plenty of space available for the stowage of a comprehensive military load which includes a Vickers' gun in the pilot's cockpit, and a Lewis gun on Scarff ring mounting in the gunner's cockpit, together with bombs, wireless apparatus, camera, oxygen and signalling apparatus, &c. The engine fitted is the latest type "Bristol" Jupiter Series VI, and this is fitted with a complete exhaust ring and tail pipes in order that all exhaust gases are conveyed beyond the cockpit. This has the additional advantage that the flame from the exhaust is completely hidden, thus rendering the machine very suitable for night flying.

Petrol is carried in two tanks which can easily be removed, carrying 56 gallons, and fitting in the wings. An additional 46 gallons tank is mounted in an accessible position on the top of the fuselage, and here also accommodation is found for a 9-gallon oil tank. Oil temperature is regulated by an oil cooler fitted underneath the fuselage and provided with an automatic by-pass device for regulating the oil temperature.

The span of the machine is 44 ft. 9 in., its length 30 ft. 7 in., and its height 11 ft., whilst the track of the wheels is 6 ft. 6 in. With regard to areas, the wings have a surface of 464 sq. ft., the tail plane of 28 sq. ft., the two elevators of 25 sq. ft., rudder of 14 sq. ft., and fin of 2·2 sq. ft. The weights of the Boarhound are as follow :—

	Lbs.
Weight complete empty with Jupiter engine and tankage for 102 gallons of petrol and 9 gallons of oil	2,440
Additional structure to carry all items of equipment	90
Fuel and oil 77 gals. petrol 586 lbs. 7 ,, oil .. 70 ,, ——	656
Crew	360
Military equipment (guns, ammunition sights, camera, electrical equipment, etc.)	448
Lbs.	3,994

With reference to performance, the machine has a top speed of about 135 miles per hour and a landing speed in the neighbourhood of 50 miles per hour. The climb of the machine to 5,000 ft. can be accomplished in 4½ mins., to 10,000 ft. in 10 mins., and to 15,000 ft. in 18 mins., the service ceiling being 21,800 ft. and the absolute ceiling 23,600 ft.

During extensive flying by many pilots this machine has been found easily manœuvrable and quickly responsible to its controls and certainly from the pilot's point of view its flying qualities have been very highly appreciated.

"Bristol" Lucifer School Machine.

The "Bristol" Lucifer School Machine has established an enviable reputation as the most efficient type of aircraft which can be obtained to-day for general instructional purposes. It is, in the first place, a machine of exceptionally simple construction with practically nothing to require attention. The questions of strength and simplicity were very carefully studied in the design and as a result, for instance, top and bottom wings are interchangeable, whilst the metal struts are of "N" formation so that no trueing up is required. The oleo spring undercarriage fitted has proved itself of exceptional efficiency, whilst the 120 h.p. "Bristol" Lucifer Series IV engine which is fitted is now very widely recognised as the simplest and most reliable engine of its power.

The "Bristol" Lucifer School Machine is easy to fly, but at the same time it is exceedingly light on the controls and has very much the "feel" of a single-seater scout. As a result pupils who receive training on this type of aircraft are really turned out as efficient pilots.

In school work there are two factors which have to be borne in mind—safety and economy. With regard to the first of these it is sufficient to state that in one flying school in which "Bristol" Lucifer School Machines have been used as standard for nearly four years there has never been a single forced landing from engine trouble nor a mishap of any kind and this despite the fact that approximately 600 pupils have received training. The machines during this period have required very little attention and in point of fact have given service day after day throughout the entire period. Equally striking is the experience of the Chilean Air Force, who have adopted machines of this type for training purposes. A

Bristol "Lucifer" School Machine.

report recently received from the technical officer in charge of these machines touches upon this matter as follows :—

"As far as machines and engines are concerned we cannot speak too highly of them. The machines are nice to fly, strong, easy to repair and will do everything asked of them. The engines seem to be the result of a lifetime's study on what is required for a training machine. Our people are simply mad over them. We have Lucifers working with over 70 hours' flying without even changing a plug. From my point of view, as far as the training squadron is concerned, my work is a pleasure after dealing with rotaries for so many years. Out of 18 pupils I think there are 14 solos. This in so short a space of time was only possible because of the engine which is so simple to maintain and so easy to manipulate ; it has conquered the confidence of everyone. Our consumption is very low compared with the rotaries for the same work. Per hour we are using about 20 litres of petrol (20 per cent. benzol) and about ¾ to 1 litre of oil."

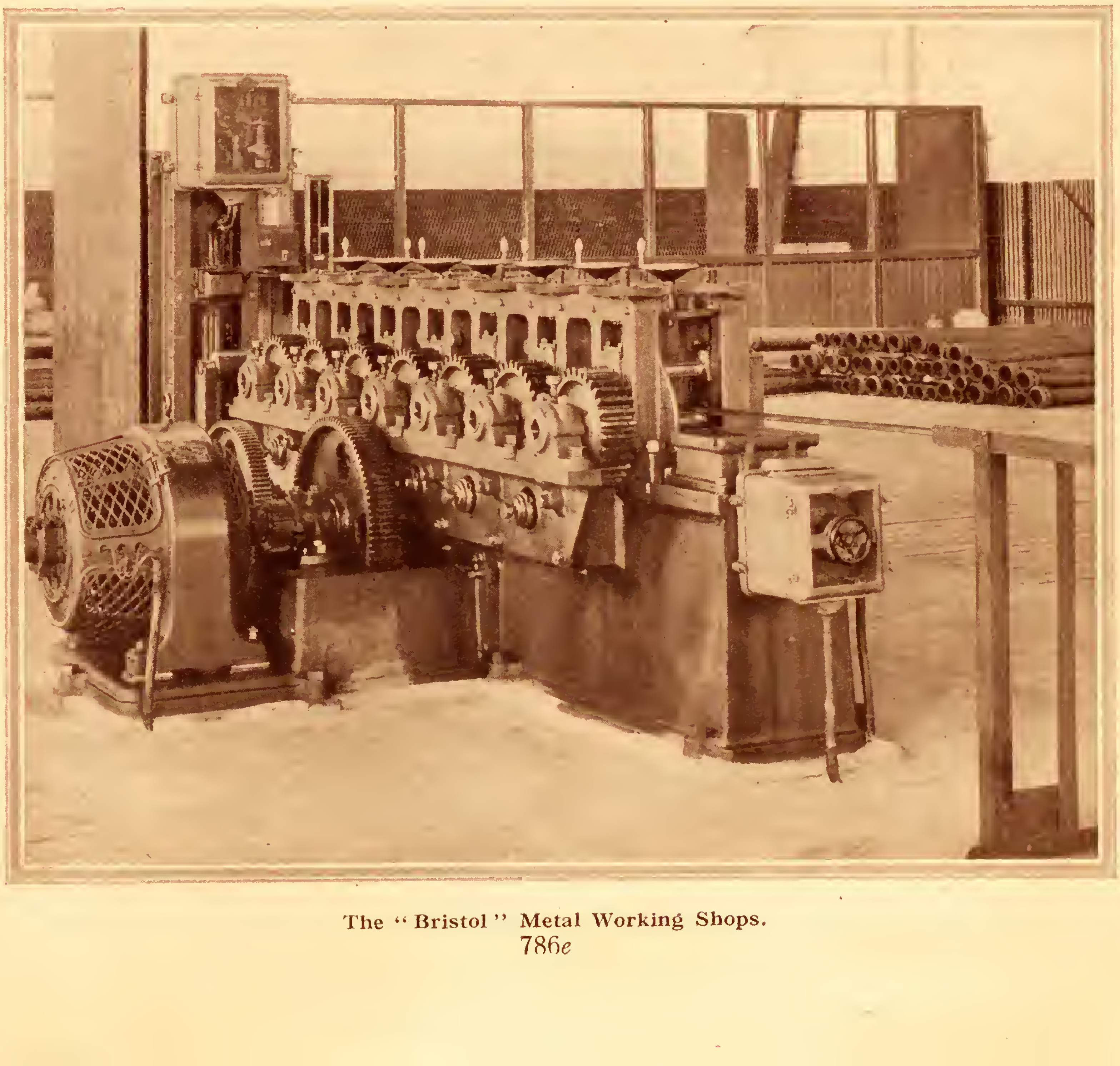
In the history of instructional flying it would surely be difficult to bring forward two examples of all-round efficiency, economy and safety than has been demonstrated in these two instances. The Lucifer School Machine is also in service in other countries with equally satisfactory results.

The "Bristol" Advanced Training Machine.

For advanced instruction in flying the "Bristol" Aeroplane Company have developed a type of aircraft similar in its main features to the famous "Bristol" Fighter and fitted with the "Bristol" Jupiter radial air-cooled aero engine. Many improvements have been incorporated in this type, such as the provision of full dual control, balanced ailerons, rudder, etc., improved tail skid and a highly efficient oleo undercarriage. This type of machine is in use for the training of reserve pilots of the Royal Air Force at two of the leading flying schools in this country.

The "Bristol" Fighter, modified and improved in many ways as compared with the early "Bristol" Fighter model which first appeared upon the battle fronts in 1917 and which proved itself the finest two-seater fighter aircraft of its period, is still a standard two-seater machine in use by the Royal Air Force, as well as by the aerial forces in many countries including Belgium, Poland, Norway, Argentina, etc.

The Bristol Aeroplane Company are the manufacturers of aircraft for all purposes, but space does not permit of machines being dealt with in detail. Mention may, however, be made of the "Bristol" Brownie Monoplane, a light single or two-seater aircraft fitted with the "Bristol" Cherub engine which has gained numerous awards in light aeroplane competitions in this country during the past two or three years ; of the "Bristol" Berkeley Bomber, a highly efficient all-metal machine fitted with the 600 h.p. Condor engine ; and of the "Bristol" Taxiplane, an aircraft fitted with the 120 h.p. "Bristol" Lucifer engine carrying pilot, two passengers and a certain amount of baggage. This machine is of strong and simple design and actual operating costs do not amount to more than one penny per passenger mile.



The "Bristol" Metal Working Shops.

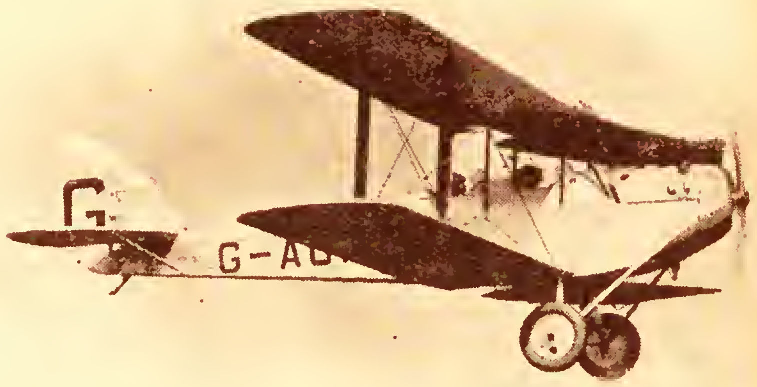
The DE HAVILLAND AIRCRAFT Co., Ltd.

CAPT. GEOFFREY DE HAVILLAND, head of the De Havilland Aircraft Co., Ltd., is one of the pioneers of British aviation. Since the war this firm has specialised upon the production of civil and commercial aircraft, and in this class of machine the firm's products range from the little D.H.53 with a 6 h.p. motor-cycle engine, to the new D.H.66 " Hercules " with three 450 h.p. Bristol " Jupiter " engines. The D.H.9A two-seater reconnaissance aeroplane is still the standard machine of the R.A.F. Among the De Havilland machines which have made history during the last few years are the " Moth " two-seater light 'plane used as standard by the light aeroplane clubs, and the D.H.50 used by Sir Alan Cobham on many of his most famous flights. Both the " Moth " and the D.H.50 can be supplied either as aeroplanes or as seaplanes.

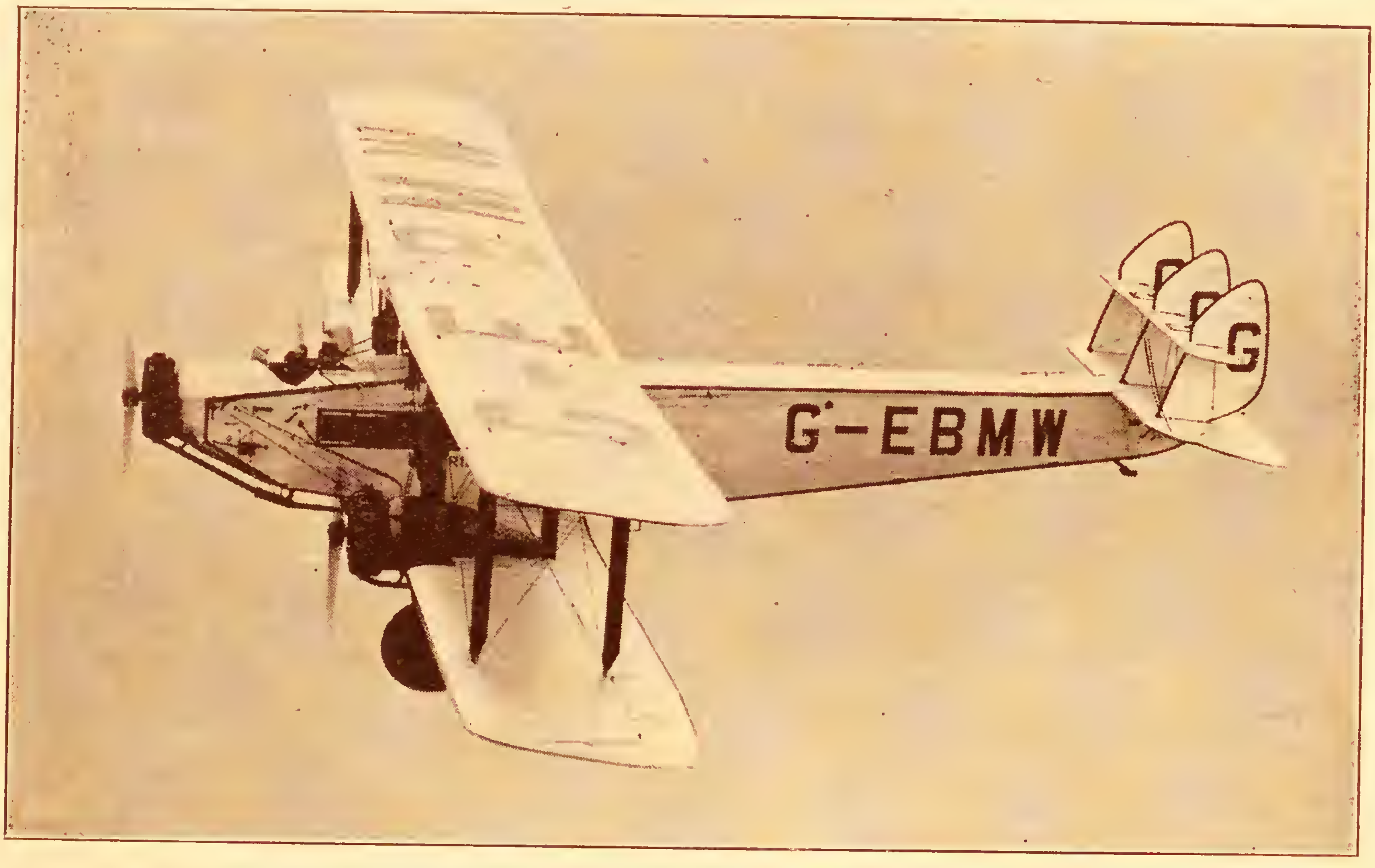
The De Havilland School of Flying, situated within 8 miles of Central London, is the largest flying school in the British Empire. Elementary training is given on " Moths," from which type it has been found that pupils pass easily to D.H.9J's fitted with 385 h.p. Armstrong-Siddeley " Jaguars," which are used for advanced training. Instruction is given in commercial, private and military flying, and the charges made are based upon the number of hours flown. Instruction can be commenced at any time.

The De Havilland school is the training centre of the R.A.F. Reserve.

The D.H.50 fitted with Siddeley " Jaguar " engine, flown by Sir Alan Cobham to Rangoon and back, Cape Town and back, and Melbourne and back. This actual machine has covered over 125,000 miles in extremes of climatic conditions.



A " Moth " in flight. This type is the standard training equipment of all the British and Australian Flying Clubs, the Irish Free State Air Force and many other organisations. It is also used by many private owners as an ariel roundabout.



The de Havilland " Hercules " in flight. Five of these machines, fitted with three Bristol " Jupiters," are being built for the desert air route from Cairo to Karachi. The " Hercules " will take off fully loaded with only two engines running, and only loses height slightly flying on one engine.

The FAIREY AVIATION Co., Ltd.

IT would be, perhaps, more desirable when dealing with, the products of such a firm as the Fairey Aviation Co., Ltd. of Hayes, to look back during the past year or so upon the series of events which have helped to confirm the prominent position these well-known aircraft have held so long in the aeronautical world. Those machines which the public have already had the privilege of investigating are too well known to require any reiteration of detail. There are, of course, many new Fairey aircraft, both in being, and on the way, which would be of absorbing interest, were it possible to divulge their secrets, but that may not be, at least at present. However, a brief retrospection of the period of aeronautics just past should be of considerable interest.

Undoubtedly, the first event to come to mind is that splendid feat, the R.A.F. Cairo-Cape Town-Cairo-England flight, which is certainly one of the most, if not the most, outstanding events in aeronautical history up to the present time. Although modestly called "an ordinary Service flight," it will be remembered what a remarkable feat this was. Undertaken by the same four Fairey III. D. aircraft and flown to a definite schedule as well, it constitutes a new record of reliability and pioneer work.

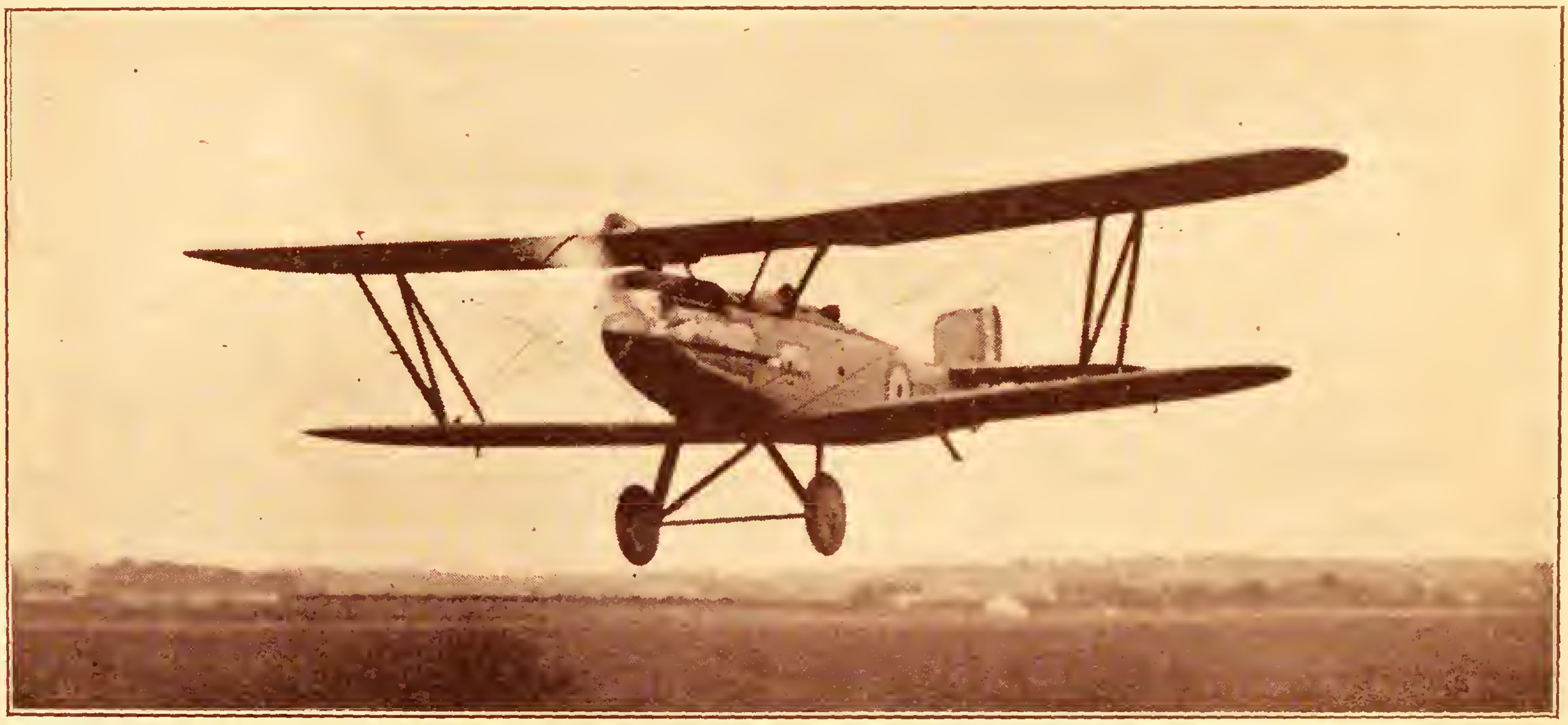
Eleven thousand five hundred miles across Africa from Cairo to Cape Town and back again and then on to England, over land and sea, through intense heat and cold and all the particular kinds of weather common to such variations of temperature—these were the conditions through which the four Fairey III. Ds. had to fly. These machines, however, as well as other Fairey aircraft, no doubt stand the test so well, as their design is so thoroughly thrashed out in the drawing office before production.

This achievement adds yet one more to the many already accomplished by this well-known series of aircraft. It will be remembered that it was to Wing-Comdr. Goble, C.B.E., D.S.O., D.S.C., that the Britannia Trophy was awarded for his flight round Australia three years ago in a III. D seaplane. During the past year much has been made of the trans-Atlantic flight undertaken during this period, but, without detracting from the merit of this excellent flight it must be pointed out that over four years ago Commander Sacadura-Cabral flew the South Atlantic using Fairey III. D aircraft. The Fairey III. D seaplane is, of course, a single-engine machine and, as such, is the only one to fly the Atlantic.

Another event during the past year which has marked yet one more step forward is the coming of the Fairey "Fox," a day bomber, into actual service. The furore that the "Fox" created when its general features first became known is still fresh in our minds, how its phenomenal advance in performance, its tremendous speed, its graceful lines all made such a widespread and vivid impression and which will give it for some long time to come a very prominent place among the world's aircraft. In fact its advent has shown it to be the inspiration of this period. Its performance and the general quality of its design are such a pronounced step forward that the "Fox" is undoubtedly the prototype of a new class of day bomber, and so will it remain until further inspiration and discovery arrive.

Those who visited the R.A.F. Display at Hendon this year must all have seen the Fairey "Firefly," the latest thing in single-seater fighters. Though this was its first and only public appearance, its welcome was exceptionally warm. The eulogies of the daily press were both spontaneous and convincing; for instance, a leading daily said of it: "The 'Firefly' is one of the most vicious-looking single-seaters that has ever been produced. It is almost a perfect streamline from nose to tail, and its speed appears to be very high." And another: ". . . a beautiful little craft and a triumph of British design and workmanship. . . ." these two instances being examples of the general trend of opinion, and it may be said that these views are more than emphasised by actual performance.

The R.A.F. ship's fighter, the Fairey "Flycatcher," and the reconnaissance-day bomber, the Fairey "Fawn," of which there are so many in the Service, are both still more than "pulling their weight," and are too well known to need any further comment.



THE FOX DAY-BOMBER : This photograph shows the clean lines and small frontal area of the Fairey "Fox." The suppression of all excrescences which might cause head resistance is particularly evident.

We have recently heard much of various large seaplanes, several of which have been acclaimed as the world's largest, but the Fairey "Titania," with its wing span of 139 ft., and total horse-power of nearly 2,800, still gives Great Britain the lead in this respect. The "Titania" is a development of the "Atalanta," and is of the same dimensions. The horse-power given by the engines in the earlier model was somewhat less. It is interesting to note that the "Atalanta" was in the air flying satisfactorily over six years ago, which goes to show how far ahead of its time the "Atalanta" was.

Finally, mention must be made of the Fairey-Reed metal airscrew. It is evident that this year has brought the metal airscrew into its own. With the increase in performance required as aircraft have developed, and the greater necessity for thorough reliability, the metal airscrew has been more and more looked to, until to-day one finds all the newest aircraft fitted with this important accessory. The Reed type of airscrew is undoubtedly one of the most important, and many of the greatest achievements have been accomplished by aircraft fitted with these airscrews. For instance, Commander Byrd, in his North Pole flight, used a Reed airscrew. All the world's high speed records are held by aircraft using these airscrews. The winning aircraft in the 1926 King's Cup air race used a Fairey-Reed airscrew as did the winner of the S.M.M.T. Prize at Lympne, 1926, meeting. The winners of the Schneider Cup races since 1923 up to, and including this year, have been fitted with Reed airscrsews, a proof of their speed qualities and reliability.

HANDLEY PAGE, Ltd.

Handley Page "Hyderabad" Night Bomber

THE Handley Page "Hyderabad" night bomber is the military development of the "W" types of aircraft which have so successfully carried on the commercial services between Great Britain and the Continent. It is fitted with Napier "Lion" engines, developing 470 h.p. at 1,320 r.p.m. on the propeller, as the normal power, and 500 h.p. at 1,450 r.p.m. as the maximum.

The main change from the commercial type is in the arrangement of the fuselage. The forward, or nose portion, is now arranged with the gunner, pilot and passenger in tandem, the gunner occupying the position right in the nose and the tandem seats of the two pilots giving a splendid range of view on both sides of the machine. The interior of the cabin is of the same ample dimensions as in the commercial machine, so that there is ample room to move about inside and for any members of the crew to change position. Aft, a further gun position is fitted both above and below the fuselage. The monoplane tail and rudder occupies a minimum amount of dead area in the region of fire aft.

The petrol tanks are carried underneath the top plane and supply the engines by gravity feed. There is thus the simplest possible petrol system and the one least likely to go wrong. Two sizes of tanks can be fitted, one carrying 350 gallons and the other 550 gallons of petrol, with corresponding durations of 7 and 11 hours' flight at crusiing speed respectively.

The specification of the machine is given below, and the general arrangement is shown in Fig. 1.

The Handley Page Slotted Wing

For the past few years Handley Page, Ltd., have been engaged upon research work of fundamental importance which has led to the development of what is now known as the Handley Page Wing. It has been found if a wing of ordinary type is pierced near the leading edge by a slot of peculiar shape, sloping backwards from the under surface to the upper, that that wing will develop a very much higher maximum lift than will the same wing minus the slot. Also that a series of similar slots, extending across the wing and dividing it up into a series of narrow chord wings, can be used still further to increase the maximum lift.

The effect is very large—60 per cent. extra loading may be carried by a wing, without increasing the landing speed, by the use of only one slot, and up to 300 per cent. by the use of multiple slots. Opening the slots increases the resistance of the wing appreciably at relatively fine angles, but, with mechanical arrangements to open and close the slots, it is possible to use the low resistance qualities of a normal wing for normal flight, and the low speed of landing, rapid get-off and steep climb given by the open slot on one and the same machine.

A great deal of experimental and research work has been carrried out by Handley Page, Ltd. and the Aeronautical Research Committee on both models and full-size machines fitted with slotted wings. The full size experiments confirm in flight the high lift coefficients obtained with the model.

A machine fitted with slotted wings is illustrated herewith. (*See* Fig. 2).

HANDLEY PAGE TWIN-ENGINED BOMBER

Normal Load

Weights	Napier "Lion" Lbs.	Kgs.
M/c. light, with water ..	7,980	3,615
Fuel (seven hours' cruising) ..	2,630	1,192
Crew: 4	720	326
Military load	2,300	1,042
Total load	13,630	6,175
Total useful load ..	5,650	2,560

Overload Capacity

	Lbs.	Kgs.
Fuel (11 hours' cruising) ..	4,130	1,880
Total useful load	7,150	3,250

Performance (with normal load)

	M.P.H.	Km./p.h.
Minimum speed 0 ft. ..	55	88
Maximum speed—		
0 ft.	111	177·5
5,000 ft.	111	177·5
10,000 ft.	108·5	173·6
Rate of climb—	ft./min.	m/min.
0 ft.	830	253
5,000 ft.	590	180
10,000 ft.	320	97·5
Time of climb	10,000 ft.	19 mins.
Service ceiling	14,050 ft.	4,130 m.
Absolute ceiling	16,000 ft.	4,875 m.

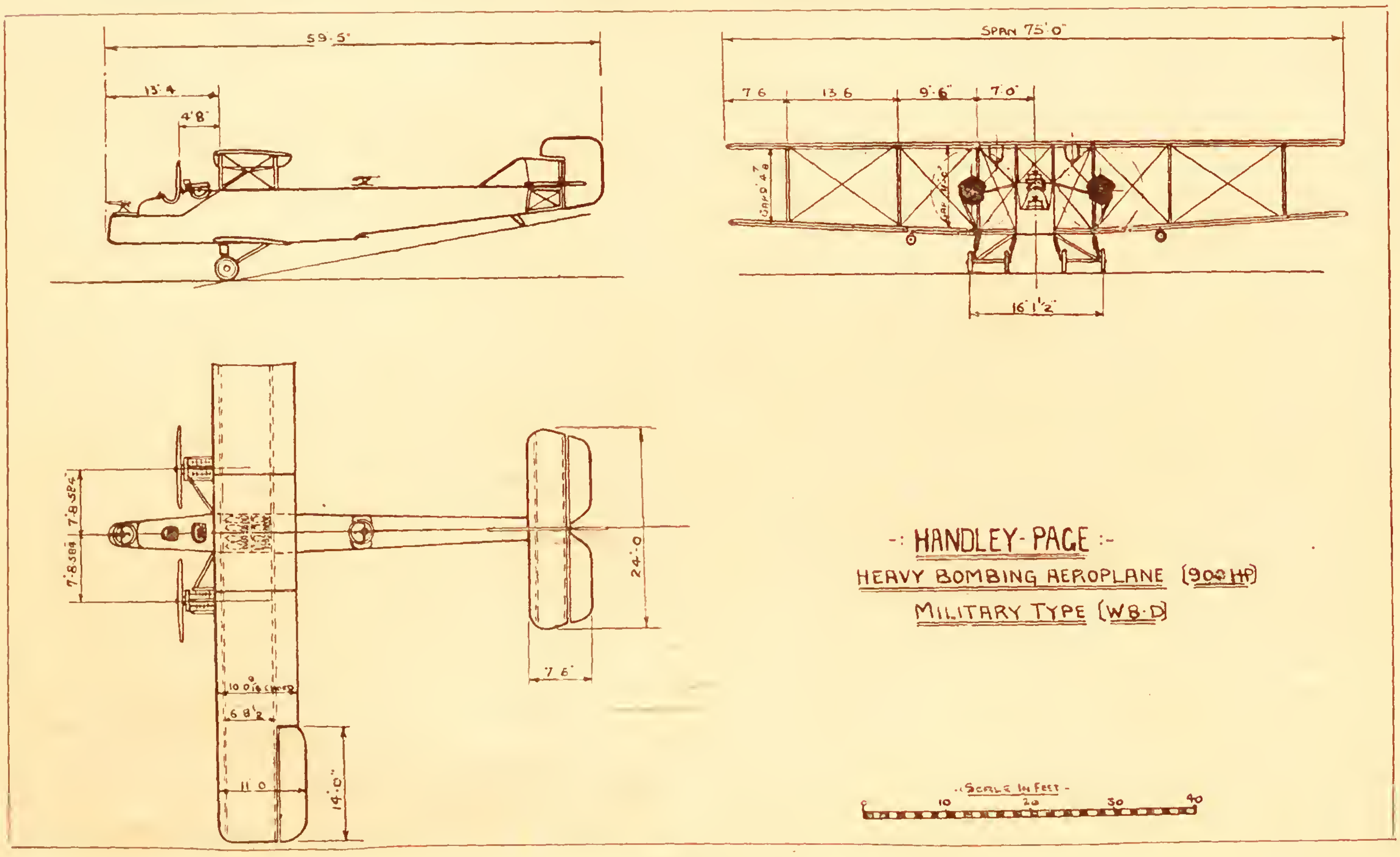


Fig. 1.

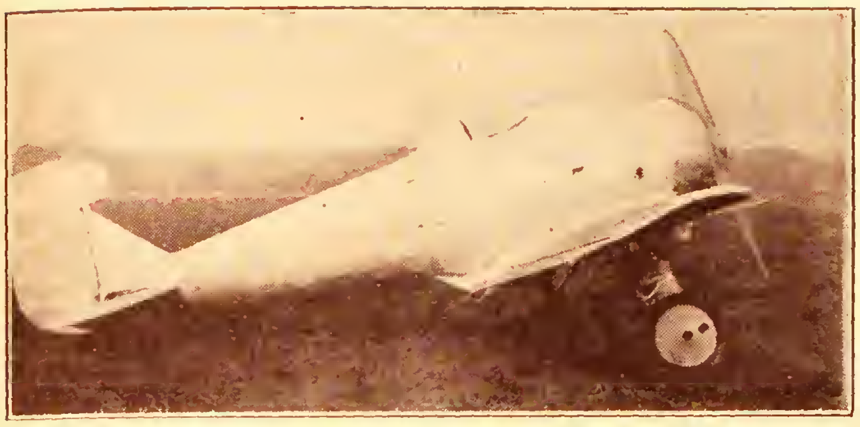


Fig. 2. Single-seater fighter with slots closed.

The wings are provided with one slot in the leading edge, formed by rocking forward on two links a small aerofoil constructed in duralumin. In the closed position this aerofoil fits snugly against the upper surface of the wing, and in this position the wing is of ordinary section. In addition, flaps are arranged all along the rear edge in such a way that when pulled down they open a second slot. These rear flaps are inter-connected with the front aerofoil, so that when the slot is opened the flaps are pulled down and thus open a second slot situated in front of the flap. By this means the angle at which the maximum lift is obtained is quite normal, the extra incidence necessary to obtain lift with the forward slot being compensated for by a decrease in angle due to the rear slot and flap.

A further development in the use of the slot is that for lateral control purposes. By the interconnection of the outer portion only of the forward aerofoil to the aileron, full lateral control can be obtained at and beyond the stalling point of the aircraft. The mechanical operation of this is shown in Fig. 3.

There are two cases to consider, one with slots closed and the other with slots open. With slots closed an upward movement of the aileron gives no corresponding movement of the forward aerofoil, whereas a downward movement of the aileron causes the slot to open. When the slots are open the reverse takes place, a downward movement of the aileron causes no movement of the forward aerofoil, but an upward movement of the aileron closes the forward slot.

In both cases, when the aircraft is stalled, the wing which is falling, retains its lift owing to the open slot, whereas the other wing which is rising, is caused to burble, owing to the closed slot. By this means decreased lift and increased resistance is obtained on the wing which is rising, with the result that practically no rudder is required to neutralise that difference in resistance between the two wings which is set up in the ordinary machine with ailerons operated in the normal manner.

The specifications of the two machines illustrated above are as follows:—

" HENDON " 450 H.P. NAPIER " LION "

Weights.	lbs.	lbs.	kgs.	kgs.
Machine light (with water) ..	3,968		1,798	
Fuel	686		311	
Crew (2)	360		163	
		5,014		2,272
Military useful load		1,956		886
Total load		6,970		3,158

Weight, per sq. ft. 12·4 lbs. per sq. m. 60·5 kgs.
,, per h.p. 14·81 lbs. per sq. m. 6·7 kgs.
Range at cruising speed : Approx. 3 hours.

Performance.	M.p.h.	Knots p.h.	Km.p.h.
Speed at sea level	110	98	176
Landing speed	45	40	72
Rate of climb at sea level	520 ft./mins.	159/m./mins.	
Climb at 3,000 ft.	7 mins.		
Service ceiling	10,000 ft.	3,050 m.	

HANDLEY PAGE SINGLE-SEATER FIGHTER.

Load Distribution.	B.R.II, 220 h.p.		"Jaguar" 385 h.p.	
	lbs.	kgs.	lbs.	kgs.
Machine light ..	1,330	602	1,720	779
Petrol	200	91	400	182
Oil	40	18	50	23
Crew	180	82	180	82
Useful military load	180	82	180	82
Total weight ..	1,930	875	2,530	1,148
Range at cruising speed	3 hours.		3 hours.	
Performance.	(*Actual*)		(*Estimated*)	
Maximum speed at	m.p.h.	k.p.h.	m.p.h.	k.p.h.
ground	146	235	178	286
Landing speed ..	49	79	55	88
	ft./min.	m/min.	ft./min.	m./min.
Rate of climb.. ..	1,800	549	2,400	732
Climb at 3,000 metres	8 mins.		5 mins.	
,, 5,000 ,, ..	18 mins.		10 mins.	
Service ceiling ..	21,000 ft.	6,405 m.	27,000 ft.	8,235m.

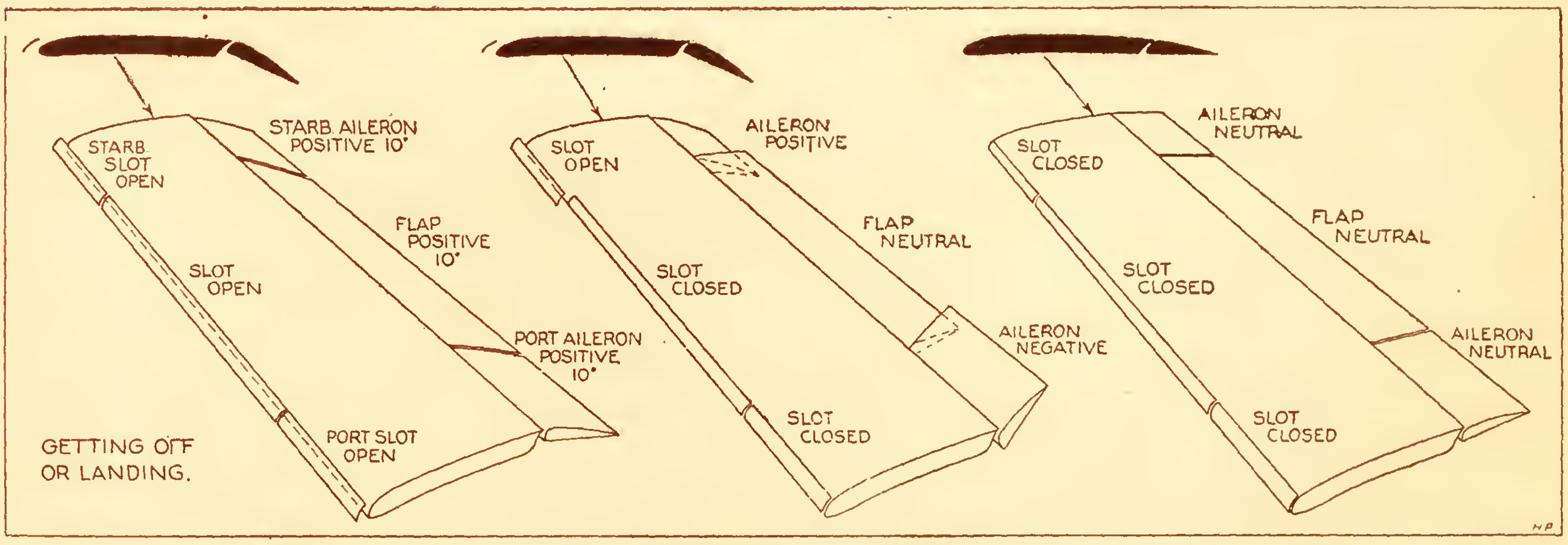


Fig. 3. Diagram of slot combinations.

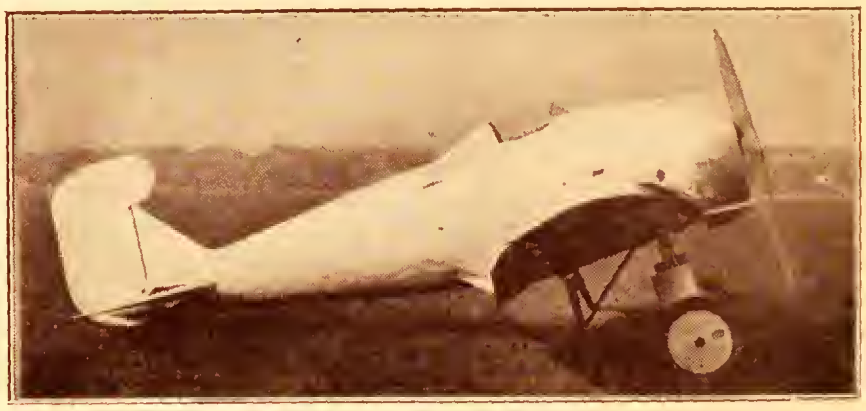


Fig. 4. Single-seater fighter with slots open.

The GLOSTER AIRCRAFT Co., Ltd.

WHERE TO SEE BRITISH AIRCRAFT

By A VISITOR TO CHELTENHAM

In the world's aeronautical calendar the Paris International Aero Exhibition is one of the events of the year. It is by no means as convincing or instructive an event as the British counterpart, the Royal Air Force Display at Hendon, which is a practical demonstration of what British aircraft really can do.

International Exhibitions, however, are always of particular interest. They bring together the products of different countries and thus enable useful comparisons to be made. Unfortunately, in the case of Paris foreign representatives discover that the Exhibition is international more in name than in fact, which is disappointing.

There will, no doubt, be many visitors to the Paris Exhibition who, like myself, are keenly interested in British aircraft. I am afraid the Exhibition will afford them little opportunity of indulging that interest, for unless I am greatly mistaken, British aircraft, as distinct from British engines, will be conspicuous principally by its absence. "Where to see British Aircraft" is therefore not a guide to the British Exhibit in Paris.

My disappointment in this respect is tempered by the reflection that exhibition machines are exhibition machines, and to see them freshly doped and decorated on ornate exhibition stands is to learn little about their real flying qualities and fitness. Things are not always what they seem, as we sometimes discover when we get up into the blue. The exhibition stand is, after all, little more than an introduction to the machine exhibited. To form an accurate judgment of the qualities of the machine, we must have accepted tests and, moreover, see the particular constructor's factory and methods.

To judge British aircraft, therefore, and to realise the unqualified superiority of British design and workmanship, one must cross the Channel. I am convinced that anyone visiting Great Britain and inspecting the British Aircraft Industry, can have little doubt that British aircraft forms the vanguard of aeronautical research to-day. It is in support of this conviction that I write the following impressions of one of the factories I visited, the Gloster Aircraft Company's factory at Cheltenham.

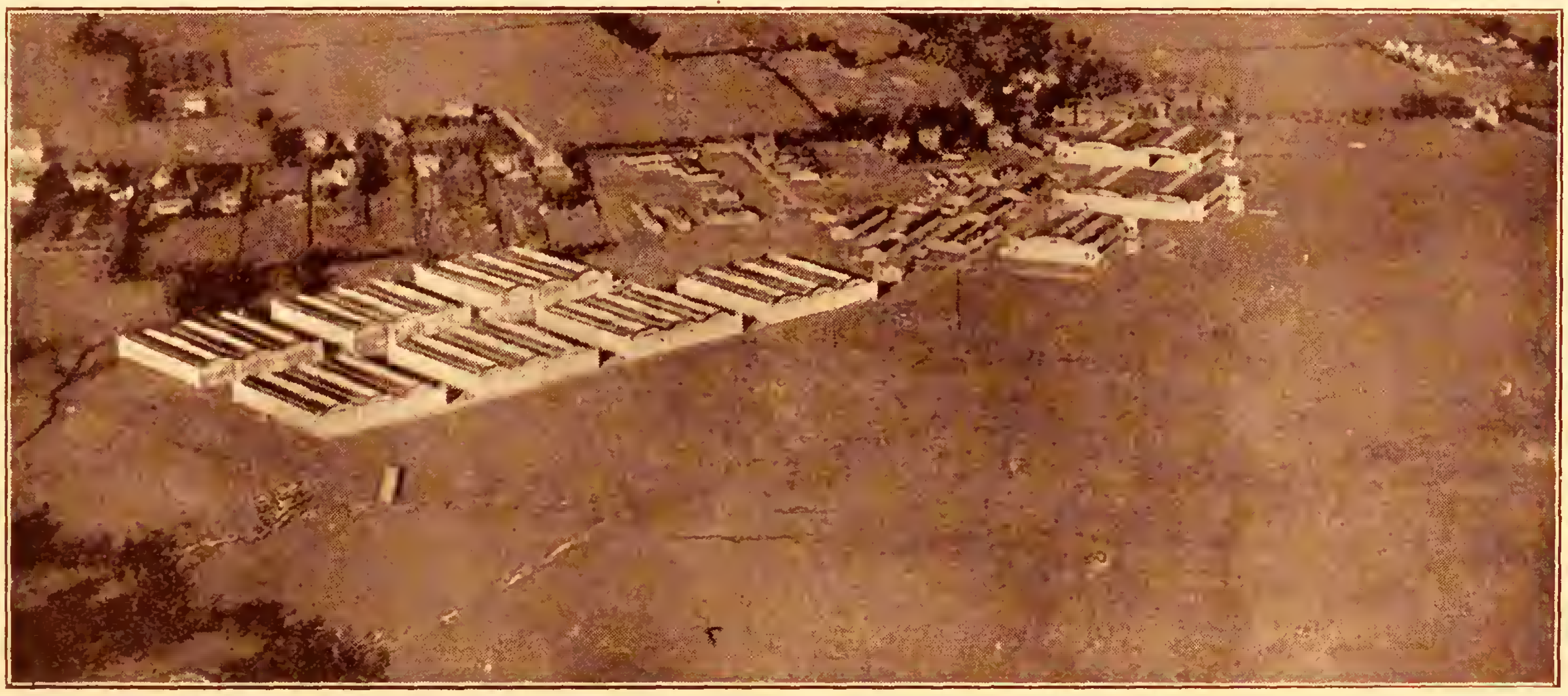
When preoccupied with arranging a programme for my stay, the name "Gloster" came irresistibly to my mind in the first place. It seemed to conjure up in my brain visions of swift birdlike forms, and graceful lines suggestive of good design and sound construction. I could scarcely go wrong if I selected "Gloster" for my first visit.

The Gloster Works are conveniently situated next to the main railway line which runs from Bristol northwards through Cheltenham to Birmingham, Manchester and the North, a branch line running into the factory itself. The buildings have obviously been designed for efficient and rapid production. I was informed that the factory turned out nearly 100 machines per month during 1917-1918, when great demands were made upon them. The efficient administration and the order and system prevailing throughout the works impressed me.

It takes a full day to get round the 12 acres of shops which comprise the factory. My tour began with the timber section, a series of extensive buildings literally humming with work. Here I was able to verify the Gloster reputation for good workmanship, which is undoubtedly of a high standard. I visited shop after shop in the whole process of aircraft manufacture; the very up-to-date woodworking mill, woodwork finishing section, propeller shop, polishing shop, all with their excellent inspection and selection organisations; then on to the foundry and the extensive sheet-metal shops. Here I watched the Gloster petrol tanks in the making. Almost all Gloster types have the petrol tanks neatly recessed into the upper wings and secured in a very simple way by four bolts only. These tanks can be taken out and replaced in the short space of less than half an hour, a considerable advantage over tank installation in the fuselage which often requires hours for replacement. The Gloster arrangement, moreover, has the additional advantage of providing a simple gravity feed to the engine, which eliminates all pump troubles.

Amongst the numerous detail parts which I examined in the engineering shops was the Gloster patent oleo undercarriage, which is one of the neatest and best on the market. Here, too, it was obvious that metal construction plays an important part in Gloster progress. This Company is concentrating its efforts as regards metal construction on the all-steel method, and most of their types are now being produced in steel as well as in wood. I had an opportunity of seeing several all-steel machines later in the erecting shops. The metal construction experimental section gave me an indication of the very thorough way in which this firm is tackling the important problem of the application of metal to aircraft construction.

In the erecting shops were, of course, the finished products —"Grebes," "Gamecocks," "Gorcocks," and others—an impressive array. I know of no other make of machines so pleasing to the eye as Gloster machines. Their graceful lines seem to me to court the air, and I have no doubt in my own mind that this has a good deal to do with their exceptional performances. To look at the "Gamecock," with its clean engine cowling, its machine guns nicely let into the sides of the fuselage, its tanks neatly recessed into the wings, after having seen in detail the excellent workmanship put into it, is to understand without difficulty how this fighting scout has won for itself a reputation as signal as that of the



Gloster private aerodrome at Brockworth.

Gloster Grebes (Jaguar engine) demonstrating at the Lympne Light 'Plane Meeting.

well-known Gloster "Grebe." Both these types are now prominent features of the Royal Air Force equipment.

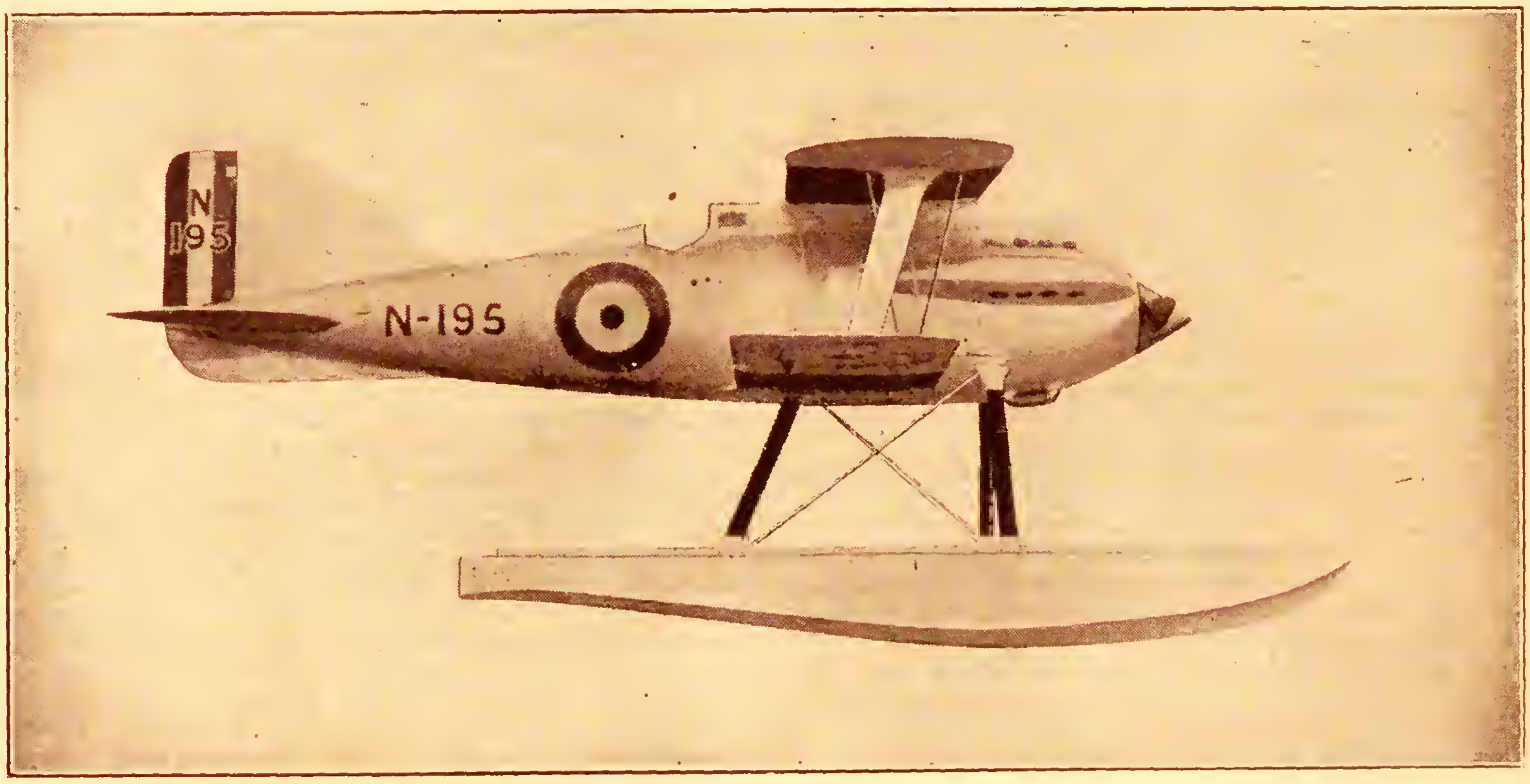
I was privileged to have a brief glance at several new types now being constructed on the company's own initiative, including single-seaters, two-seaters, bombers, and others. Foreign representatives will do well to watch the development of this firm's progressive policy.

The experimental department, of course, I was not allowed to see in spite of all my powers of persuasion. I have reason to believe that amongst the closely guarded secrets of that department is a new Schneider Cup machine which is expected to be a serious competitor in next year's race.

But the preliminary to all the activities of an aircraft firm is the designing department. Without efficient design, of course, neither organisation nor workmanship, however good, is of any avail. The Gloster Company are to be congratulated upon their very able chief engineer and designers and their competent staff, who work in a drawing office, the dimensions and equipment of which are such as few aircraft firms are fortunate enough to possess.

It was of particular interest to me here to discover to what extent the Gloster Company endeavour to meet the requirements of the foreign market. Preference for this or that type of engine, whether for climatic or other reasons, is frequently the determining factor in selecting the type of machine to be adopted. I was surprised to find that the Gloster Company, in addition to the design of the standard type with standard engine, had already prepared designs for fitting almost any possible alternative engine, British or foreign, to their machines with a view to foreign requirements.

The Gloster Company, furthermore, guarantee the specified performance of their machines to all purchasers, a practice of considerable importance to foreign missions responsible to their Governments for the recommendations they put forward. There can, therefore, be no question of fictitious



Gloster III. racing seaplane with Napier Lion engine.

performance figures; on the contrary, I understand that the Gloster practice in specifying performance is to give a conservative estimate which is invariably exceeded.

* * * * *

Having completed my tour of the factory, I was taken to the aerodrome at Brockworth a few miles away. In the ten enormous hangars there must be sufficient accommodation for several hundreds of machines, ample room for the day when aviation comes to its own. A number of "Grebes" and "Gamecocks" were standing by awaiting their departure for Service units. Incidentally, one "Gamecock" was awaiting a flip to one of the Baltic States for demonstration purpose, while another machine was being tested before despatch to the Far East.

I witnessed a demonstration of both the "Grebe" and the "Gamecock," which made me envious of the Service equipment of the Royal Air Force.

One always associates the Gloster Company particularly with the Single-Seater Fighter, and they undoubtedly are to-day one of the principal, if not the principal constructors of this class of machine in the world. The Grebe, the Gamecock, and the Gorcock are but the latest of a series of successful Single-Seater Fighters produced by this firm. I think I am right when I say that the Gloster Company have supplied more machines of this class, of post-war design, to the British Government than any other firm. Bearing in mind the very high standard required by the British Air Ministry for Service machines this fact is an eloquent testimony to the quality of Gloster Fighters.

The Single-Seater Fighter is the most important unit of any air force equipment. Upon the superiority of this class of machine in any future war, will, I think, depend very largely the issue of the conflict, at any rate in so far as aerial warfare is concerned. Nothing could be more convincing of this than the Hendon Display of last July in which, incidentally, some 70 Gloster Fighters participated. It is to the credit of the Gloster Company that they recognised this fact from the first, and applied all their initiative and resource to the production of a highly efficient Fighting Scout. Their success in this direction is, I think, due in no small degree to high speed research work which has always been a prominent feature of their activities.

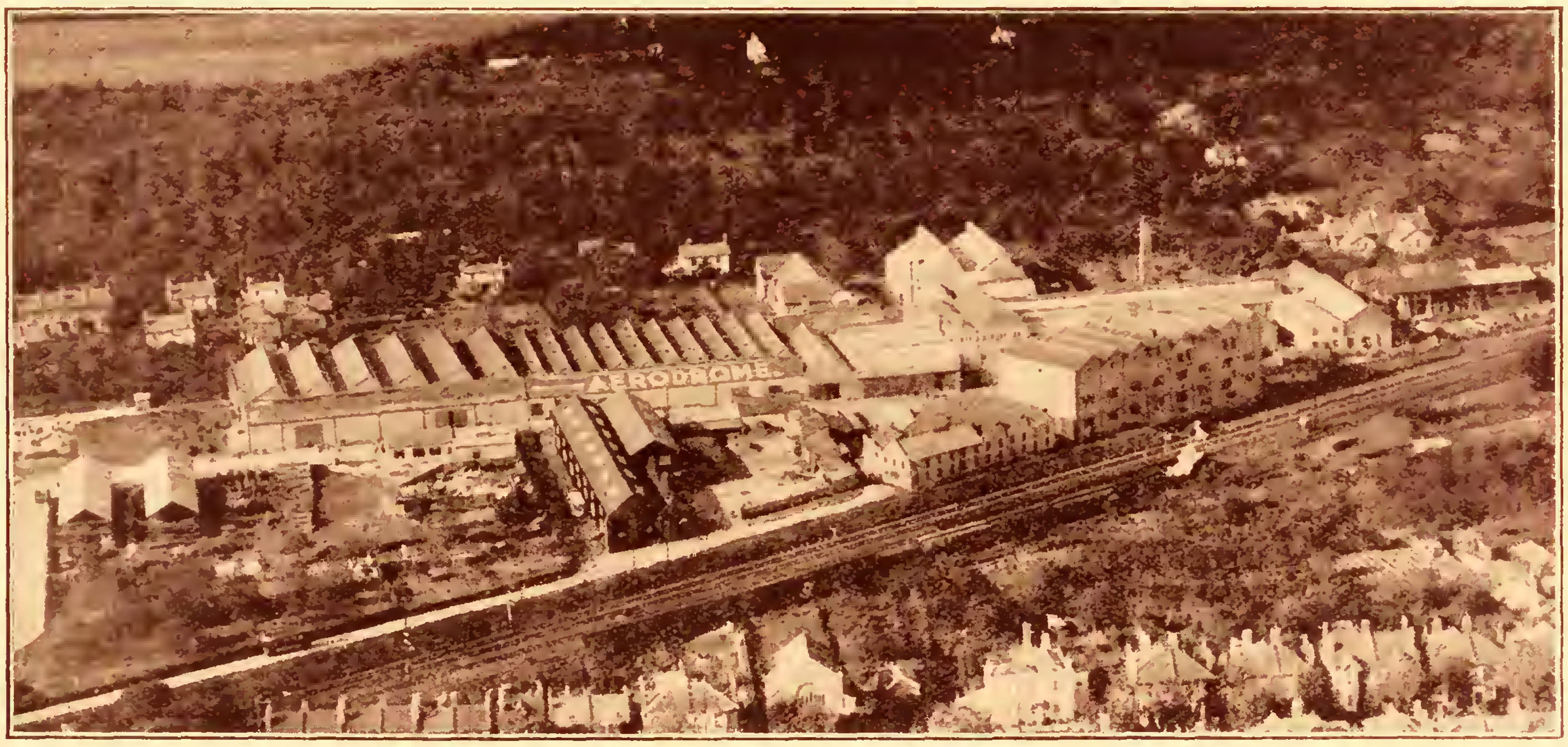
They produced in 1921 the first real British racing machine, the Gloster "Mars I" or "Bamel" as she came to be called, which won the Aerial Derby and the handicap of that year at an average speed over the 200-mile course of 163 miles per hour. This machine was actually turned out in little over six weeks and entered the race practically without preliminary tests, a striking proof of the quality of Gloster design. Later in that year the Bamel raised the British speed record to 196·6 miles per hour, and at Martlesham Heath Experimental Station she achieved the phenomenal climb of 20,000 ft. in 12½ min.

Though long since outclassed by speedier Gloster machines the Bamel is still on the active list. Erected on floats she is now being used as a practice machine for the British Schneider Cup pilots which, by the way, speaks very well for the workmanship put into it. The Gloster Bamel constituted a landmark in the development of British aviation which is borne out by the fact which I learnt at Cheltenham, that a model of the machine is shortly to be placed in the South Kensington Museum.

The Bamel was followed by the Gloster I, a development of it, which won the Aerial Derby both in 1922 and 1923. The average speeds attained were 180 and 192·4 miles per hour respectively. Over an officially timed kilometer the Gloster I raised the British speed record in 1922 to 212·2 miles per hour.

Since 1923 the British Aerial Derby has unfortunately not been run owing to lack of competition. The Gloster Company however, have, I understand, been ready with a machine each year, but with no other entrants the race has had to be abandoned.

In 1924 the company decided to enter a machine for the International Seaplane Race for the much coveted Schneider Cup and the Gloster II was built. A mishap to the machine during the trials prevented participation in the race that year A new machine, the Gloster III, was produced for the 1925 race held at Baltimore, U.S.A. She finished second with an average speed over the 200-mile course of 199·169 miles per hour. The Gloster III is therefore now the fastest British machine over a distance of 100 and 200 km. The speed attained in the race however does not represent the real capacity of the machine for several reasons. Wing radiators were to have been fitted but were unfortunately not available in time for the race. Unfavourable weather prevailed during the whole period of the trials in England which made it impossible for the machine to be properly tested out before despatch to the United States.



Gloster Aircraft Company's Works at Cheltenham.

I was fortunate at Cheltenham in being able to see the Gloster III with wing radiators fitted, and a forged propeller, and a beautiful job it is too. I gathered however, that the new machine now being built by the Gloster Company for the 1927 race will eclipse even the Gloster III.

There can be no doubt that the experience gained in the designing, constructing, and testing out of these high speed experimental machines has contributed very considerably to the success of Gloster standard types.

Few British firms have done more to establish records for British aircraft than the Gloster Company. The position of Great Britain in regard to world records is an unfortunate one, and might convey to those who have not seen for themselves, the impression that British aircraft is behind that of other countries. I can assure them from what I saw at the Gloster Works that this is not so. I am convinced that with equal organisation and support the British aircraft industry is capable of capturing any world's record to-day.

Before leaving the designing department, I was shown a model of a patent variable pitch propeller now being tested out by the Gloster Company, who have acquired the world rights of the invention. It has been designed by the well-known inventor, Dr. Hele Shaw, and is hydraulically operated.

"GLOSTER"

At
Royal Air Force Display

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71 Gloster machines took part in the Aerial Display.

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45 Gloster machines in group evolutions and Royal Air Salute of 54 Single Seater Fighters

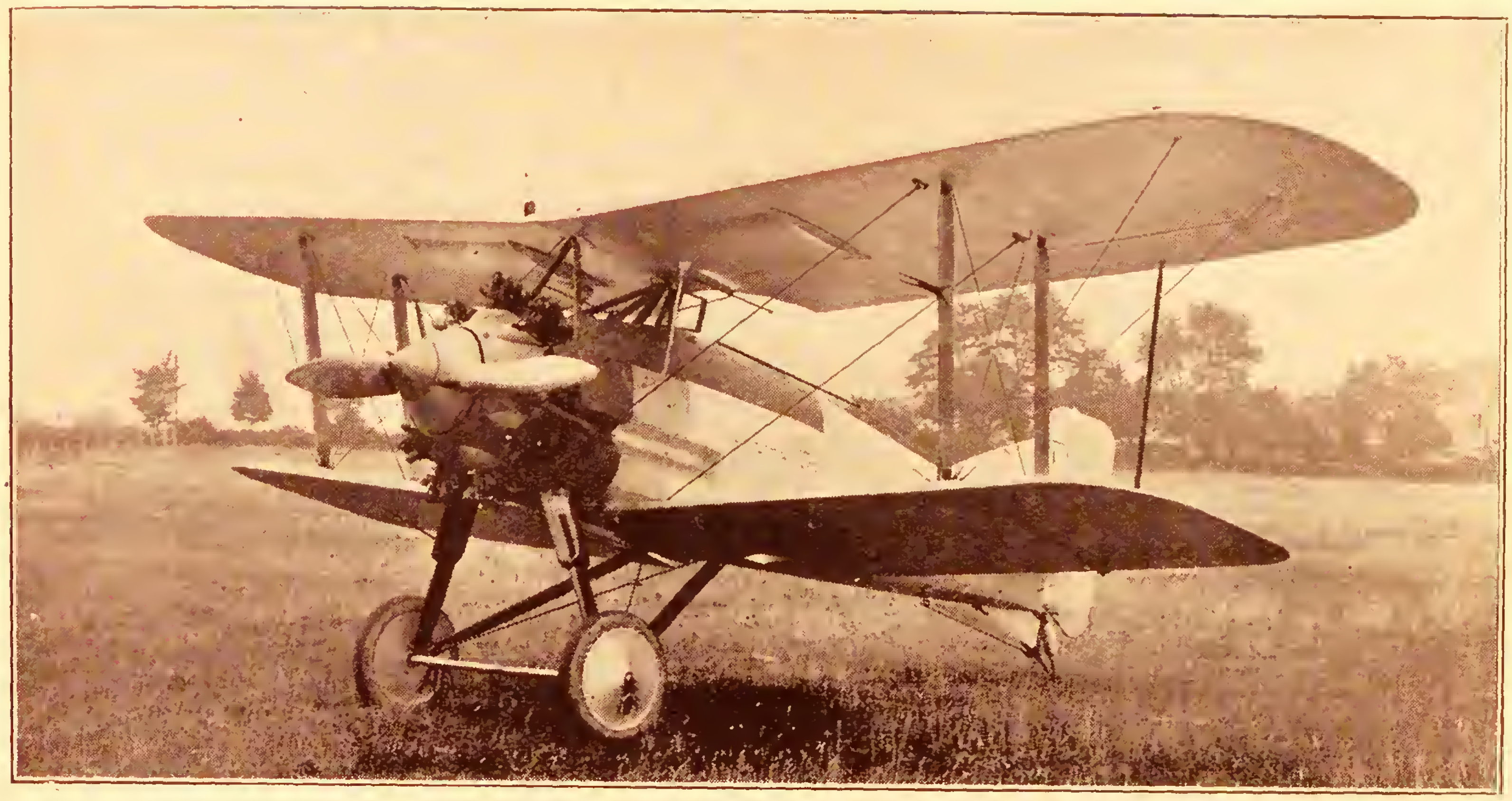
from a painting by Geoffrey Watson

THE GLOS R "GAMECOCK"
SINGLE SE ER FIGHTER

"What we have got."

"At any rate that Parade did demonstrate a few things which were worth while. Firstly, it showed that we have got first-class single-seat fighters equal to or surpassing the best in the world."
—Aeroplane, July 7th, 1926.

GLOSTER
"AIRCRAFT C^O. L^TD."
CHELTENHAM & BROCKWORTH
GLOS. ENGLAND

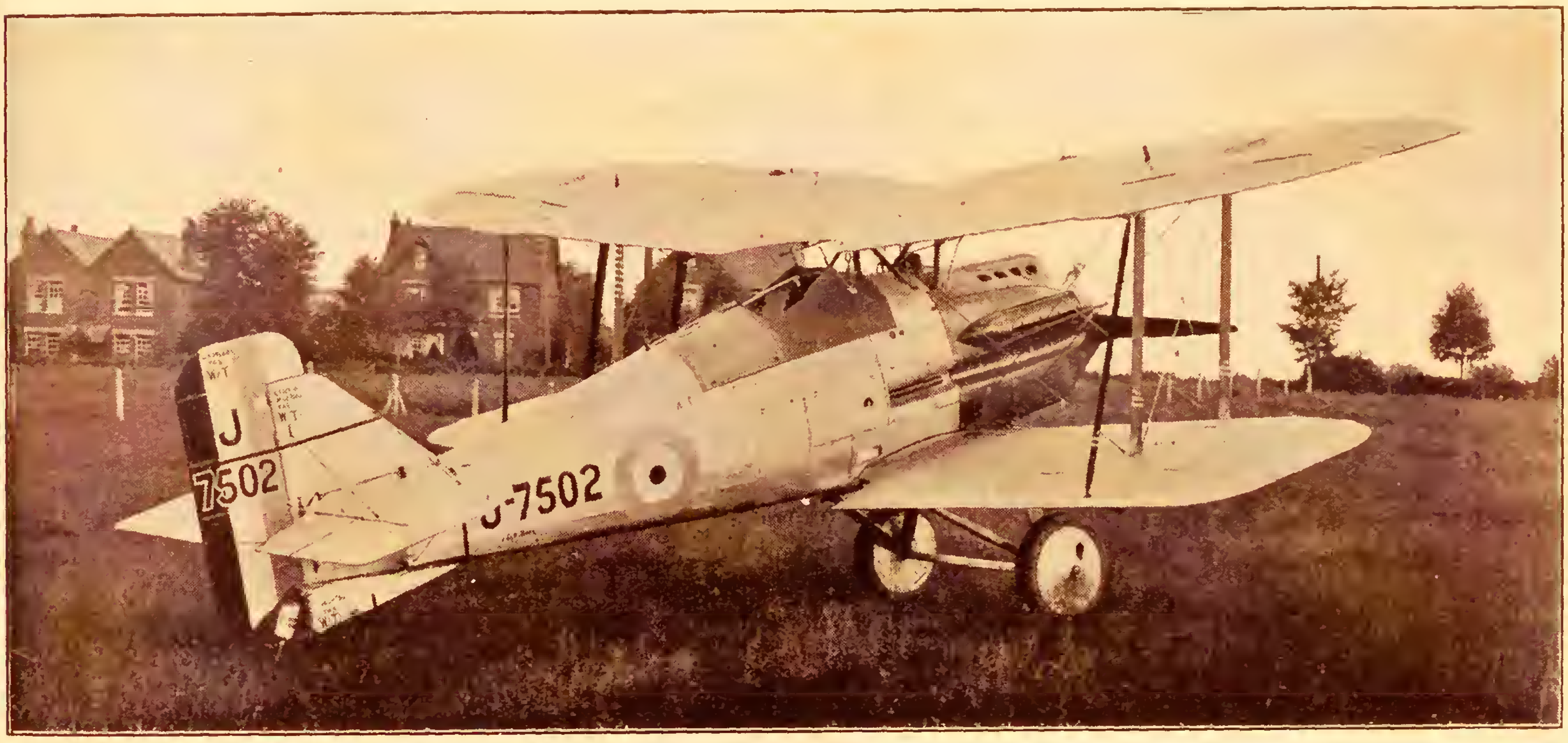


Gloster Gambet single-seater deck fighter with Jupiter engine.

It is worked by means of a variable stroke oil pump which is reversible in action, so that oil pressure can be operated on either side of the hydraulic piston which moves the blades of the propeller in either direction. The pump operation is controlled by a governor which can be set so that automatically the pitch of the blade is maintained to give constant revolutions of the engine. A separate hand control can be provided to vary any predetermined setting of the governor. The invention is very ingenious and important and its development by the Gloster Company is worth watching.

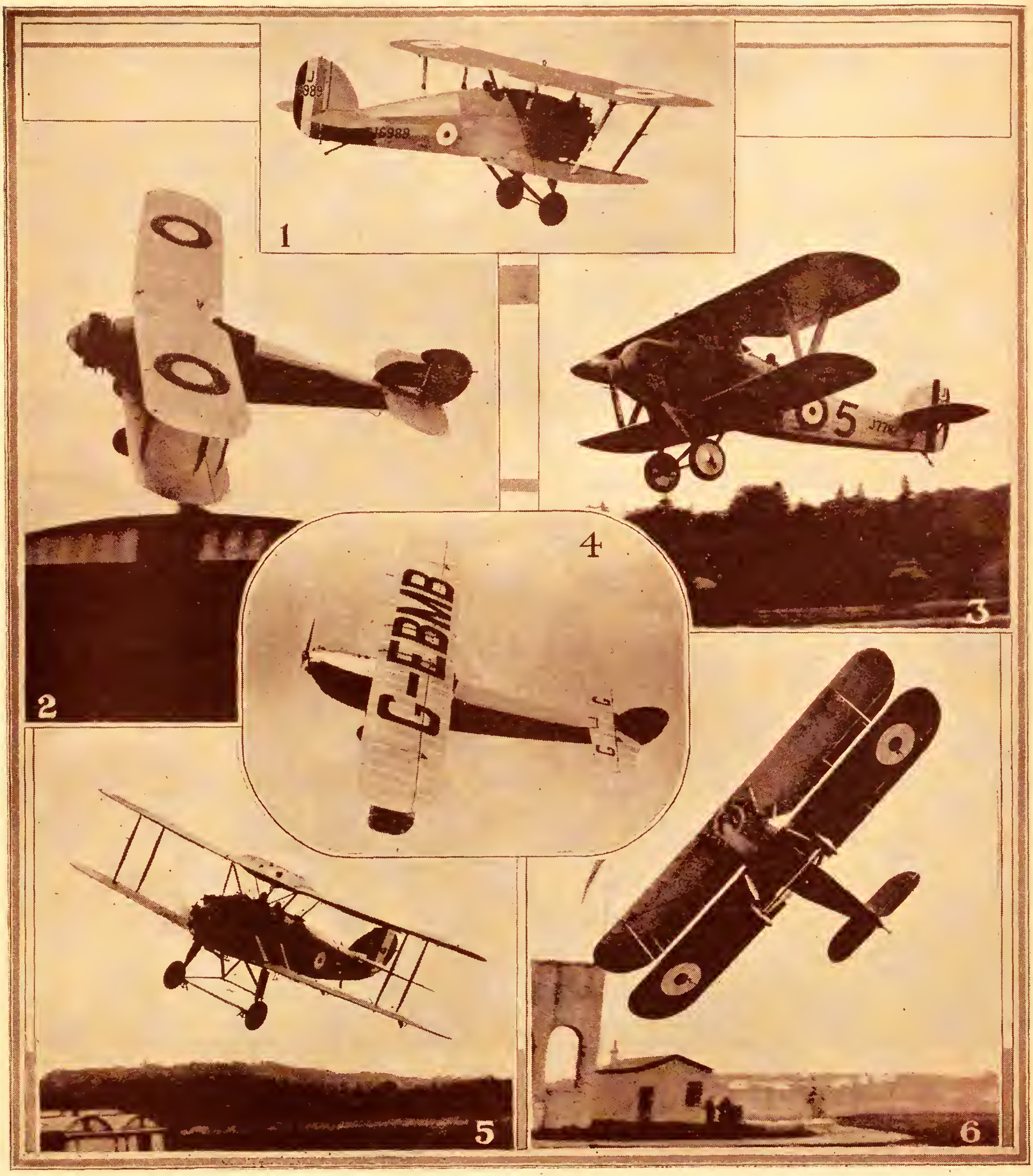
I returned from Cheltenham after a very full but highly instructive day. The Gloster Company are a progressive firm, abreast of future aviation development in all its branches, and determined that their products both in design and construction, shall remain of that high standard which has won for them the great reputation which is theirs to-day.

My visit left me with a wholesome respect for British aircraft in general, and Gloster aircraft in particular.



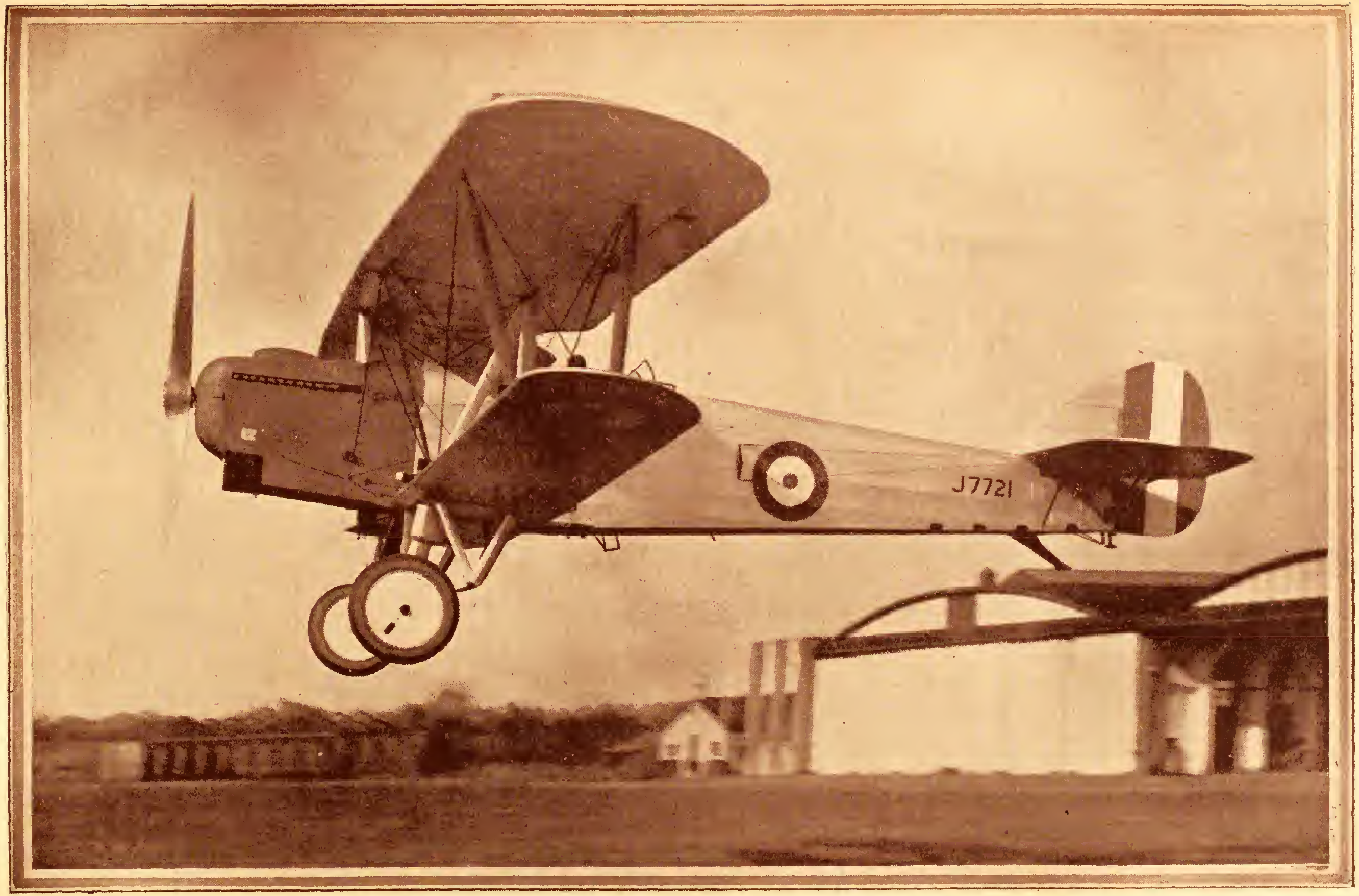
Gloster Gorcock single-seater fighter with Napier Lion engine.

The H.G. HAWKER ENGINEERING Co., Ltd.



[“Flight” *Photographs*

(1) The Hawker “Heron” with Jupiter Engine is a metal fighter embodying some novel and advanced constructional features. (2) The Hawker “Danecock,” with Jaguar engine, is a single-seater fighter, supplied to the Royal Danish Naval Air Service, and now under construction in Copenhagen. (3) The Hawker “Hornbill,” probably the most formidable “pursuit ship” yet constructed, is fitted with a Rolls-Royce Condor engine. At present the machine is undergoing secret trials. (4) The Hawker “Cygnet” is a two-seater “light” aeroplane in the actual sense, the structure weight being only 300 lbs. Fitted with Bristol Cherub engine, this machine won the “Daily Mail” Competition this year, and a sister machine obtained second place. (5) The Hawker “Hedgehog” is a three-seater fleet reconnaissance machine with Jupiter engine and carries a big useful load. (6) The Hawker “Woodcock” with Jupiter engine, the standard night fighter of the Royal Air Force.



[" Flight " *Photograph*

The Hawker " Horsley," now the Standard Day-Bomber of the Royal Air Force, is an aeroplane of outstanding merit. It was officially selected after competitive trials with other machines and has a remarkable all-round performance record. This illustration depicts the machine being tested by Flight Lieut. P. W. S. Bulman, at Brooklands.

A.V. ROE & Co., Ltd.

AVRO TRAINING MACHINES

A. V. ROE & Co., Ltd., can justly claim to be experts in the matter of training. Ever since Colonel Smith-Barry demonstrated so conclusively with the Avro 504.J that not only was the Avro a wonderful training machine, but that it was possible to train pupils to such a degree of proficiency that they could immediately transfer to fast single seaters without intermediate training on "step-up" types, the Avro has been acknowledged to be the ideal military training machine.

Perhaps no one type of aeroplane has been fitted with so many different engines as the Avro, but all the experience gained in this way has led to one conclusion—if the qualities essential for military training are to be retained, only radial or rotary engines are useful. The requirements for a training machine are somewhat peculiar. If a pilot competent to fly fast scouts is to be produced, he must be trained on a machine which has the flying characteristics of a fast scout. Experience with the Avro has shown that only rotary or radial engines permit the close approximation of the centres of gravity and pressure which alone can produce many of these essential qualities. Both of the latest Avro training machines are therefore fitted with engines of these types. The "Gosport" (how apt is the name!) is intended for military training, and is fitted with the new Monosoupape engine, and the 504.N with the Armstrong Siddeley "Lynx" is for naval training and can be converted easily to take a twin float undercarriage.

The "Gosport" is still at first sight the old familiar Avro but at closer quarters a number of modifications are visible. Perhaps the most important from a school flying point of view is the redesign of the centre section plane. The area has been reduced by cutting back the leading and trailing edges as far as the main spars, and the top main planes have been tapered at the root section. As a result both the Instructor and the pupil have a greatly improved view forward and overhead. The ailerons also have been altered. By a skilful redesign of the contour the "feel" of the lateral controls now corresponds perfectly with the elevators and rudder. Moreover, in a turn, there is appreciably less drag on the outside aileron than was the case with the old pattern. The tail skid has been connected with the rudder controls so that the machine can be handled on the ground more easily.

Apart from these visible alterations, however, the machine has been very considerably lightened, but so carefully that, although the weight has been reduced by about a hundredweight, it is still as strong as a training machine should be.

The "Gosport" is even more easily manoeuvrable than the old 504.K—no doubt a sweeping statement to make, but true. Actual performance figures are not of great importance in training, but the following will be of interest: top speed, 87½ m.p.h.; minimum speed, 35 m.p.h.; Climb, 670 ft. per min.; Range, 2 hours.

For naval training the seaplane version is type 504.O, and can be converted to a landplane (type 504.N).

The modified centre section plane and ailerons as described above are fitted, and in addition, tail trimming gear, so that the incidence of the tail planes can be adjusted during flight. A feature of the sea undercarriage is the great strength of the floats, which are boat-built of a double mahogany skin on elm frames. The floats are of the single step type with veebottoms. No tail float is used. The land machine has a special oleo undercarriage.

This interchangeability from seaplane to land plane is a most important factor in naval training, and it can only be achieved by using an engine of relatively high power. Not only has the seaplane a good power reserve, but it is admirably suited for high altitude work, while the reserve of power on the landplane is such that the machine can be flown quite satisfactorily on one-third throttle.

The following are the performance figures :—

	Seaplane.	Landplane.
Top speed	92 m.p.h.	95 m.p.h.
Minimum speed ..	42 m.p.h.	40 m.p.h.
Climb	600 ft./min.	850 ft./min.
Range	3 hours	3 hours.

AVRO "AVIAN."

The Avro "Avian" is, above all, an efficient aeroplane. A feature which contributed towards the very considerable interest displayed in the "Avian" at the Light Aeroplane Competition at Lympne in 1926 was the extraordinarily large useful load which could be carried, and the remarkably high speed which could be attained while carrying this load.

It is essentially as a private owner's machine that the "Avian" has been standardised for production. Numerous modifications have been made in the design of the original competition machine which would not have been possible but for the fundamental excellence of the initial design, permitting the alteration of wing areas and the incorporation of numerous improvements to enhance the comfort and accessibility of the machine generally. Simplicity of design (so that an owner can maintain his machine and keep it airworthy without possessing a great deal of skill or technical knowledge), accessibility of the power unit and all working parts, robustness of construction, reliability and comfort are the first requirements for the private owner's aeroplane. All these points have been foremost in the designer's mind. Add to all these the high speed, the long range and the large luggage capacity, all better than in any other light aeroplane, and the "Avian" is, without question, the only aeroplane for the airman who flies for his own pleasure.

The choice of two engines is offered. The Armstrong Siddeley "Genet," as fitted to the competition machine, but with dual ignition, or the A.D.C. "Cirrus" Mark II, also with dual ignition. In both cases the method of installation permits easy access for examination and adjustments. The petrol system is direct gravity. The oil tank for the "Genet" engine is fitted to the side of the fuselage, where it forms part of the fairing. The oil for the "Cirrus" is contained in the engine sump. A fireproof bulkhead separates the power unit from the front cockpit.

Complete dual controls are fitted. The control, column in the front cockpit can be removed, and the rudder bar can be disconnected and used as footrest for the passenger. Both cockpits are roomy and comfortable for long flights. The occupants are well protected from the wind.

The "Avian" is easy to fly. It has a good degree of positive stability. It is economical. It is safe. It is efficient.

This machine will shortly be marketed at a very attractive figure.

AVRO "BISON" Gunnery Spotting and Fleet Reconnaissance Aircraft.

This aeroplane has been expressly designed for fleet cooperation, particularly in regard to gunnery spotting and reconnaissance generally. A particular feature of its design is that it can be landed on the deck of an aircraft carrier, and it is, in fact, one of the safest aeroplanes for deck landing which have yet been constructed.

The Avro "Avian"

The pilot is seated below the leading edge of the top main plane and from this position he has an excellent view for landing. Behind him is the top rear cabin with large windows on each side to facilitate observation. Behind this cabin on a raised platform is the gunner's position from which he may communicate directly with the cabin. In order that observation may be carried out in close co-operation with the pilot, a sliding hatch is arranged in the roof of the cabin just behind the pilot's cockpit.

General construction.—The fuselage is of all-steel construction, the cabin portion being covered with three-ply wood and the remainder with linen doped in the usual manner.

The engine mounting is a separate unit, and it is possible to remove it completely from the machine with the engine, when the mounting can serve as a bench on which to stand the engine on the floor of a workshop. The pilot's cockpit is an entirely separate unit, and is mounted directly on the top forward longerons of the fuselage.

The main planes are built up on spruce spars with Warren girder ribs and tubular steel drag struts. They are arranged to fold in order to minimise housing space on the deck of an aircraft carrier. The interplane struts are of tubular steel with wooden fairings. The main planes are of a special high-lift section, and this feature combined with the remarkably powerful and accurate controls, produces in a marked degree the qualities necessary for deck landing.

The undercarriage is of the Oleo and compression rubber type, specially developed to withstand the heavy shocks which are inseparable from deck landing. The rear portion of the fuselage contains flotation bags, and an emergency signalling apparatus is carried in a suitable locker in the tail plane.

Top speed, 108 m.p.h.; range, 4 hours; ceiling, 14,400 feet.

AVRO "ALDERSHOT" Single-engined Bomber.

The Avro type 549 has been expressly designed for long-distance bombing. Its exceptional stability makes it particularly suitable for night operations, and it has, in fact, been extensively used in England for night flying with very good results.

The fuselage is large and affords ample space not only for the stowage of military equipment, but permits the careful arrangement of the bombing position. It has also been possible to arrange for very complete defensive armament in order to minimise the necessity for a fighting escort.

In view of its large size, the fuselage is built in sections, in order to facilitate transport and repair. All the crew are situated behind the main planes and their positions are such that parachutes may be readily used.

The fuselage is built with a double deck, the lower deck forming the bombing position and the wireless and navigation cabin, while the upper deck accommodates the pilot and navigator at the forward end and the rear gunner at the after end. All members of the crew can move freely about from one deck to another.

General construction.—The fuselage is of all-steel construction. The nose and engine mounting are covered with quickly detachable metal cowling, the cabin with three-ply wood and the tail portion with linen, doped in the usual manner.

The main planes are built on spruce spars with Warren girder ribs and steel drag struts. The outer planes are arranged to fold. Interplane struts are of steel tubes with wooden fairings. If desired, all-metal wings can be supplied. The wing fittings, however, are of special design, so that in case of shrinkage of the wooden spars in a hot climate, they can be easily tightened up.

The tail plane is mounted well above the fuselage in order to obstruct the rear gunner's view as little as possible. Complete tail controls are fitted and the tail plane incidence can be adjusted during flight.

The aileron control is operated on the differential principle which minimises any tendency to yaw.

The rudder and elevators are balanced and are light and powerful in action.

All these factors combine to produce the large degree of stability which is necessary for precision bombing.

Top speed, 110 m.p.h.; range, 6 hours; ceiling 14,000 feet.

AVRO "ANDOVER" Ambulance, Troop Carrier or Freight Machine.

The Avro "Andover" may be equipped alternatively as an Ambulance, as a freight-carrier or for passenger transport.

The cabin is of large dimensions (6·69 metres long and 1·42 metres wide with 1·8 metres clear head room). In addition, a baggage compartment and a lavatory are provided at the rear end of the cabin. It is possible to arrange the cabin to accommodate twelve passengers, or, if desired, fewer passengers and a corresponding load of freight can be carried. Large windows along each side of the cabin allow a good view for the passengers, and the door, owing to the method adopted for the construction of the fuselage, can be made in a variety of sizes and shapes to suit the particular purpose of the machine.

In flight, the "Andover" is stable and steady, and is light and easy to handle on all controls, so that the pilot does not become unduly fatigued during long flights.

The pilot's cockpit is situated just below the leading edge of the top centre section plane, and he has an excellent view in all directions, particularly for landing. The navigator's station is alongside the pilot's seat, but at a lower level, with direct access to the main cabin by means of a door in the sound-proof bulkhead which separates the cabin from the nose of the fuselage.

General construction.—The forward end of the fuselage is of wood, and consists of a spruce frame, covered with a skin of three ply wood glued and rivetted on. This is covered with linen and doped. The rear portion is of tubular steel construction, faired to a good streamline shape and covered with linen and doped.

The engine mounting is bolted to the front of the fuselage and the engine is isolated from the pilot's cockpit by a fireproof bulkhead. Efficient engine silencers are fitted, and these, combined with the sound-proof construction of the cabin, make it possible for the passengers to converse without difficulty.

The main planes are of mixed wood and metal construction, and a special feature is the method of attachment of the tubular steel drag struts to the wooden main spars. The attachment fitting is so made that it can be tightened up in the event of shrinkage of the spars in a tropical climate. The planes are arranged to fold in order to economise housing space. All covering is of linen, doped.

The petrol system is entirely gravity. The petrol tanks are two in number and are carried one under each top main plane.

The undercarriage is of a specially developed Oleo type, incorporating rubber in compression. This type of alighting gear has been proved to be most efficient, and heavy landings can be made without inconvenience to the passengers. The tail skid is sprung by means of rubber in compression.

Top speed, 110 m.p.h.; range, 6 hours; ceiling 13,500 feet.

AVRO "AVA" and "AVENGER."

Two Avro machines about which little can be said at the moment are the "Ava" and the "Avenger." The former is a multi-seater twin-engined night bomber and coastal torpedo defence landplane fitted with two 670 h.p. Rolls-Royce Condor III engines. The latter is a single-seater fighting scout fitted with a direct drive 525 h.p. Napier "Lion" VIII engine. This machine has a remarkable turn of speed.

The Avro "Ava"

The Avro "Avenger"

SHORT BROTHERS Ltd.

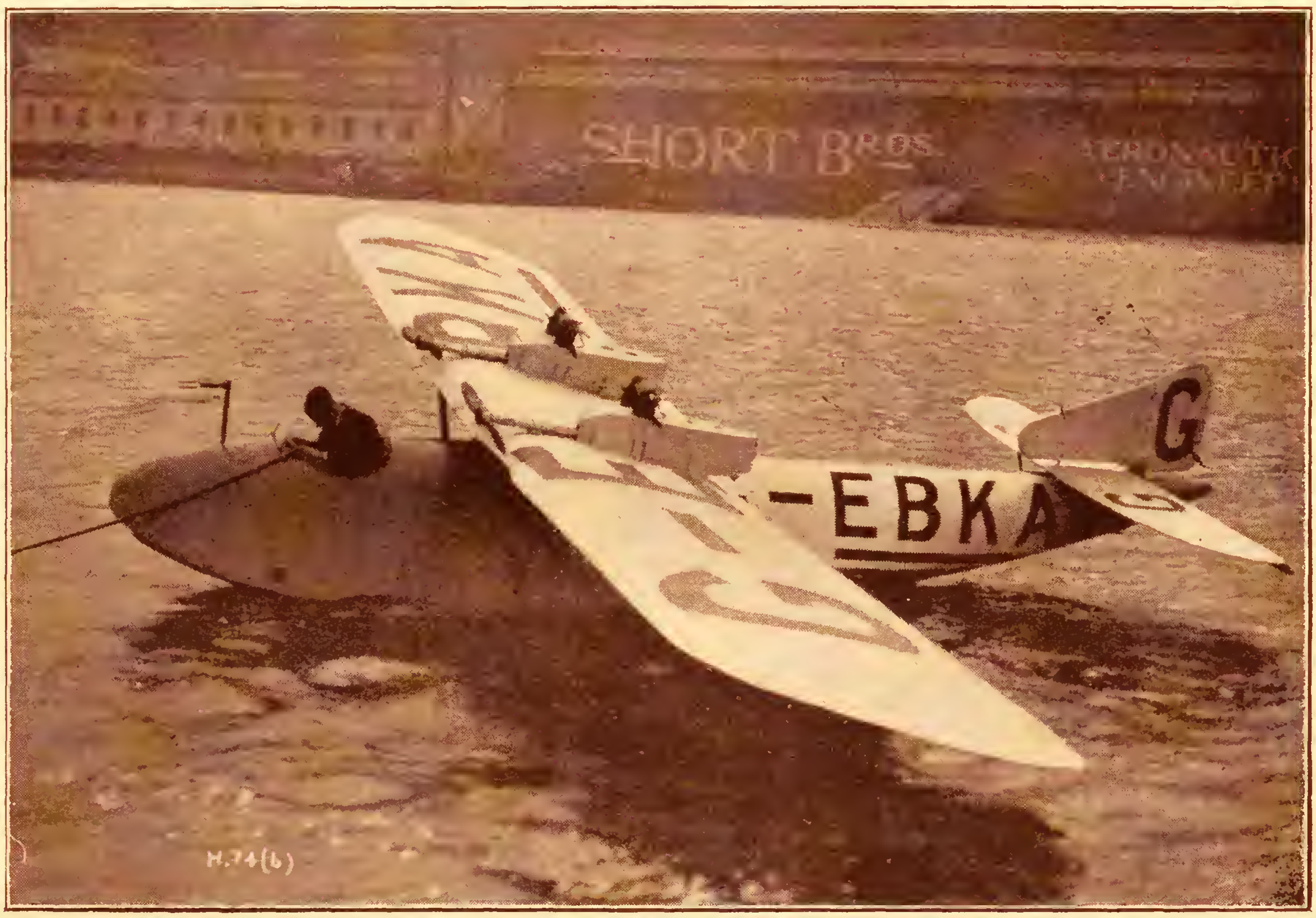
SHORT BROTHERS' wide experience in the construction of rigid airships made them familiar with aluminium alloys, and when it became apparent that something more durable than wood and fabric was required in modern aircraft, they saw that by using duralumin in the construction of aircraft it would be possible to build complete machines lighter and stronger, and definitely more durable, than the present type.

The results have been extremely satisfactory and show that for equal weight a higher factor of safety can be obtained with duralumin than with a wooden structure.

The advantages of using non-inflammable material is apparent, and the known deficiencies of wood and fabric aeroplanes, such as distortion and deterioration due to climatic conditions, are obviated.

The construction generally lends itself to rapid production, as all the parts which comprise the making of a complete machine can be stamped out of sheet material.

Short all-metal aircraft are completely built of duralumin, including the wing spars, with the exception of minor parts in which it is found that steel is a more suitable material.



The small flying-boat "Cockle" referred to above.

In the early days of their experience with light alloy aircraft, there arose a great deal of opposition from various sources on the account that the metal used, Duralumin, was not sufficiently stable for use in the stressed parts of aircraft, and considerable doubt was expressed as to the suitability of this metal on account of corrosion. After five years of intensive construction it has been found that by proper application this metal can be safely used in nearly all the parts of aircraft, and that corrosion is not dangerous to the structure if ordinary care and maintenance is given.

The first machine built by the firm was a single-seater, single-engine, tractor-biplane, and was designed to carry mails or light freights to the amount of 400 lb. If desired, space could be arranged to take two passengers instead of mails.

The machine proved a great success, not only as regards the method of construction, but also as regards its performance, and definitely showed that the advantage in weight saving by the use of duralumin was substantial.

It was thought that the vibration caused by the engine would cause crystallisation of the metal used, and fracture of rivets, and very exhaustive tests were carried out at the Royal Aircraft Establishment in order to obtain information on these questions. The machine was subjected to vibration tests of high and low frequency for the duration of several hundred hours, without any damage whatsoever to the structure.

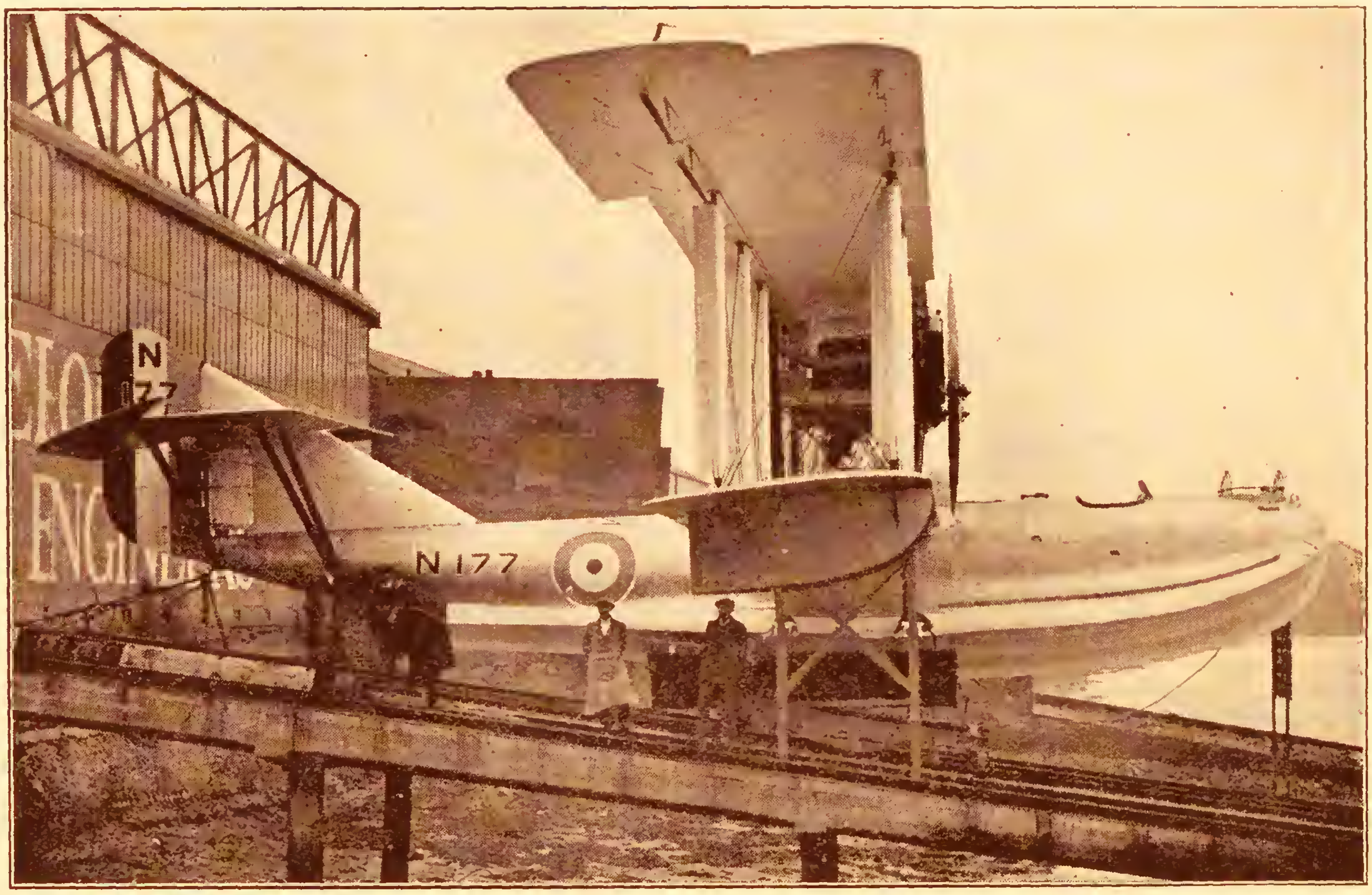
Continuing with the development of all-metal machines, Short Brothers produced the first all-metal boat made in this country.

This was a single-seater monoplane flying-boat, and was fitted with twin engines of 16 h.p. each; the engines used were standard Blackburn motor bicycle engines, and the machine gave an excellent performance and was satisfactory in every respect. This machine was subsequently purchased by the Air Ministry, and was fitted with two Bristol "Cherub" engines in lieu of the Blackburn engines, in order to increase the performance.

The Air Ministry has been watching the firm's experiments in all-metal construction very closely, and an order was placed for an F.5 metal hull to be fitted to the existing main wing structure. The order was completed, and the machine was delivered to the Air Ministry and has been in continual service for over two years. Various tests were carried out in order to determine its durability when left on open water, and in exposed places. As the result of the successful results given, a further order was placed for a large flying-boat. This machine has since been delivered and is now undergoing tests, and initial reports are extremely satisfactory.

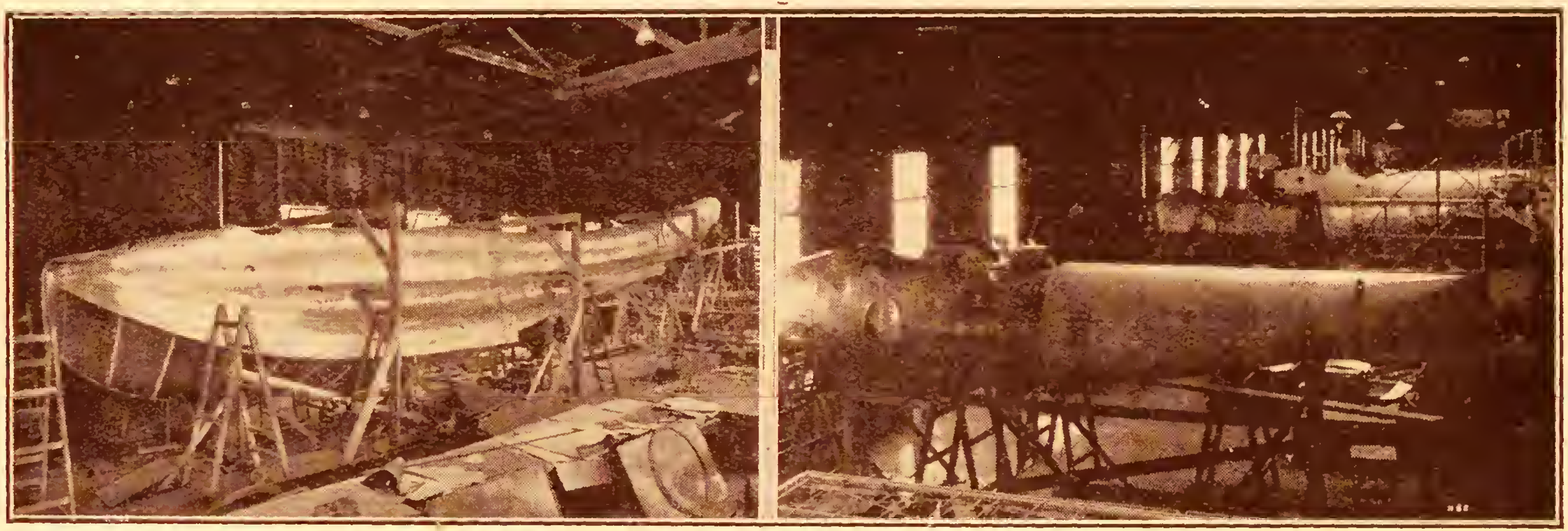
It is regretted that service regulations prevent more details being given of this and other machines under construction for the Air Ministry, and which show, in actual practice, the tremendous advantages of metal over wooden construction.

The firm has also been entrusted with an order by Imperial



A Short F5 fitted with an all-metal hull, as described above.

Airways for two three-engined flying boats to carry approximately 20 passengers. These machines have a range of 680 miles, and will have a cruising speed of 100 miles per hour. When completed the machines will be put in service on a section of the England to India route.



On left, a large all-metal hull under construction at Short Bros. Rochester Works, and on right, a series of all-metal fighting machines.

Another interesting machine constructed by the firm is the " Mussel " seaplane. This machine is a two-seater semi-cantilever monoplane. and is fitted with a 60 h.p. " Cirrus " engine. Its performance as a seaplane is extremely satisfactory, and with a total weight of 1,430 lb. has a top speed, at sea level, of 84 miles per hour. The rate of climb is 360 ft. per minute, and it has an endurance, at cruising speed, of four hours.

The illustrations show an F.5, fitted with an all-metal hull as described above ; a large all-metal hull now under construction at the firm's Rochester Works, and a series of all-metal fighting machines. The small flying boat shown is the " Cockle " referred to above.

* * *

GEORGE PARNALL & Co.

Under the direction of Mr. George G. Parnall, acting as General Manager of their Aircraft Department, Parnall & Sons, of Bristol, acquired an excellent reputation during the war for the machines supplied to the Air Board and Admiralty. Mr. Harold Bolas, M.B.E., B.Sc., A.M.I.C.E., A.F.R.AeS., of the Admiralty, Air Department, was released as a designer, and produced the Panther Ship Aeroplane, of which a large number were ordered. Mr. Parnall also was responsible for the supply of a large number of Avro machines, Hamble Baby Seaplanes and Short Bombing machines, etc.

After the Armistice, the firm abandoned Aircraft Manufacture, and Mr. Parnall started business as George Parnall & Co., retaining the services of a considerable number of the original personnel, Mr. Bolas continuing to act as Chief Designer. Mr. Parnall is to be congratulated upon his courage and enterprise in initiating such a business at that time, and upon the success with which his efforts have so far been attended.

George Parnall & Co., although designing all types of aircraft, have realised the insular position of Great Britain, and the outlying portions of the Empire, and have devoted special interest to the production of aircraft, which can be operated from a ship's deck, and also to amphibians of pure seaplanes and flying boats.

The Parnall Panther.—This machine was designed by Mr. Bolas during the war, and was a ship's aeroplane, with hydrovanes and flotation bags for emergency landings on the water. Next came the Parnall "Puffin"—a central-float seaplane amphibian possessing a number of curious features. This machine had wing tip floats to assist the central float in rough seas and high winds, and it was also provided with an inverted tail unit—that is, fin and rudder were placed underneath the tail plane and elevators to give a clear field of view aft. The rear portion of the central float was hinged, and acted as a skid when the machine was on land.

The Parnall Possum was an experimental triplane intended to examine the merits of central engine units, with gear drives to airscrews on the wings. In a final and ambitious form the system would embrace a large central engine room containing the whole of the power plant, with engineers in charge who would attend to the motors and even perform repairs in the air in case of breakdown of any one power unit, the machine flying in the meantime upon its remaining units.

The Possum has a gear drive of the simplest type, embracing a single Lion engine in the fuselage driving the airscrews on the wings through bevel boxes and wing-shafts. Clutches, with their weight and liability to trouble, were eliminated. Although the method of mounting the engine and airscrews involves more weight than is found in normal methods, the arrangement has distinct advantages.

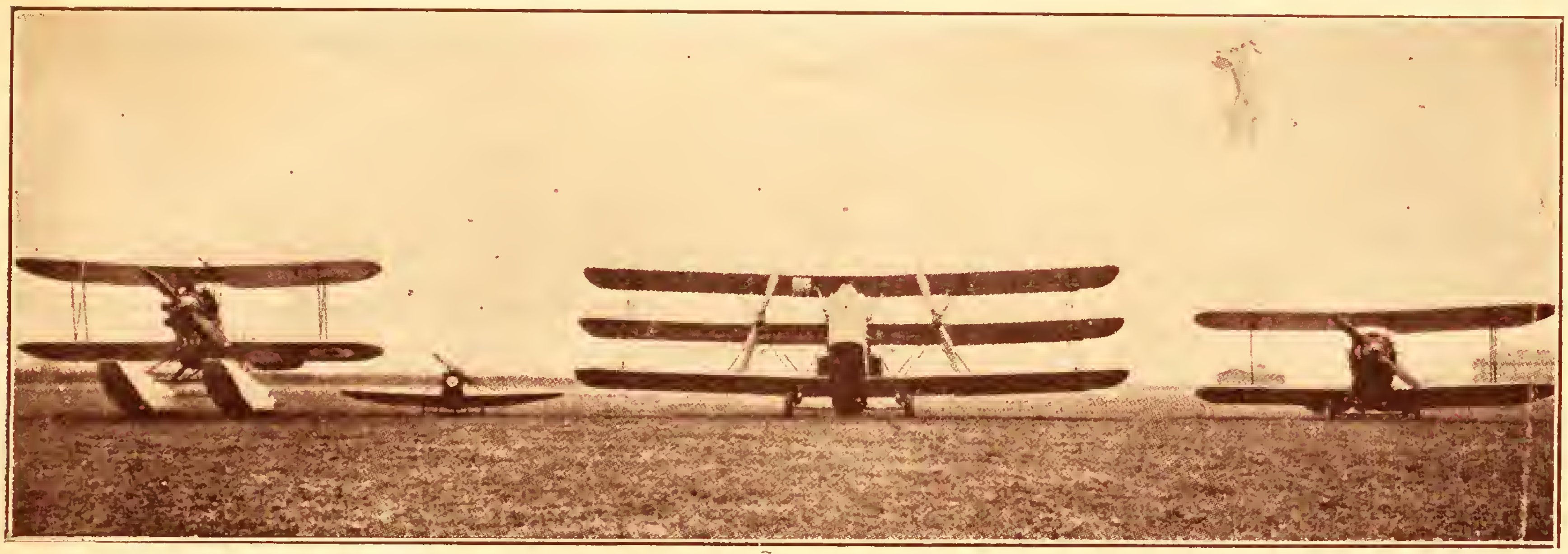
The machine was fitted with parachutes, and had a steerable tail wheel, which could be braked for landing on small aerodromes. The fuselage had accommodation for a crew of three, and a compartment for mails.

The Parnall Plover is a single-seater ship's fighter, designed for use from the turret of a ship, or from the deck of an aircraft carrier. It can, however, be used with either a normal wheeled undercarriage or with twin floats. In the latter case, wheels are carried within the floats so that the machine is amphibian. Either Jaguar or Jupiter radial air-cooled engines can be fitted. One of these machines flew in the King's Cup Race of this year, and was piloted by Squadron Leader Sir Christopher J. Brand, one of the first airmen to fly to South Africa from the Motherland.

The amphibian conversion is an imposing looking machine. It is fitted with a separate gas starter engine so that it may be operated without difficulty on the open sea.

For the 1923 and 1924 Lympne Competitions the firm produced the single-seater and two-seater Pixie Aircraft. The former was a monoplane, and was the fastest and lightest light aeroplane in the world—and fitted with a Douglas motor-cycle engine it won the Abdulla speed prize against all comers, at Hendon. The two-seater Pixie was convertible from monoplane to biplane, and was constructed with dual control, so as to be used as a training machine. Fitted with a Cherub III engine, this machine was again successful in the Lympne competitions of 1926.

All the machines were designed by Mr. Bolas and his staff, who are at present engaged on a number of very interesting aircraft, including an Auto-gyro for the British Air Ministry, and a machine of similar type for the Cierva Autogiro Co., Ltd.



Parnall Types—From left to right : The Plover seaplane, Pixie, Possum triplane, and Plover ship fighter.

Amongst other machines on order by the Air Ministry is a training seaplane, the Parnall Perch. This machine is somewhat unusual, owing to the fact that the pilot-instructor and the pupil are placed side by side in the fuselage and use the same instruments. It is provided with a land undercarriage, so that tests may be carried out on inland aerodromes when necessary.

George Parnall & Co. are using an increasing amount of metal work in the construction of their machines, and it is interesting to note that they built steel tubular fuselages as far back as 1920.

A short while ago Mr. Parnall purchased from the Disposal Board the buildings and aerodrome situated at Yate, near Bristol, covering an area of about 150 acres. The buildings alone afford approximately 300,000 ft. of manufacturing space, apart from the Bristol factories, and the well-deserved expansion of the business is fully provided for. George Parnall & Co. may justly look forward to the support of the Air Ministry and that of the British Dominions.

Their head offices are The Bristol Coliseum Works, Park Row, Bristol, and their factories at Park Row, Nirvart Street, Quakers Friars, Bristol; the flying sheds and works are at Yate aerodrome, Gloucestershire, and in London they are at Evelyn House, 62, Oxford Street, W.1. Cables to Warplanes Bristol.

The SUPERMARINE AVIATION WORKS Ltd.

The firm was founded in 1912 at Woolston. Several experimental high-speed hydroplanes were built, which were followed by a flying-boat hull of circular construction on which was erected a wing superstructure with central engine mounting, which was one of the first flying boats actually produced in this country. The following year was occupied chiefly with experimental work, and the improvements in design of sea-going aircraft. Following on the outbreak of war, the Government took advantage of the location of the works to repair and to recondition at Southampton damaged machines which had been returned from the Front by the R.F.C.

Subsequently the works were considerably increased, and the firm became controlled by the Government. Practically all the experimental and design work was carried out for the R.N.A.S., in addition to production orders for school flying-boats and fighting seaplanes.

In 1919 the first flying-boat Channel Service was opened with Supermarine "Channel" type passenger machines. This was extended to France during the Autumn of that year, and a large number of passengers were conveyed between England and the Continent. In September of that year the firm entered a flying-boat for the International Schneider Cup race at Bournemouth. The result of the activities of the firm during this year fully proved the possibilities of the design of the machines which they had constructed.

In 1920 Supermarine Channel type flying-boats were exported to Norway to the order of the Royal Norwegian Naval Air Service; also to a private Norwegian Company who established and ran a mail route with Supermarine machines with great success. In July the firm at the Olympia Aero Exhibition showed a modified and improved Channel type flying-boat, together with the Supermarine "Sea King" single-seater flying-boat. In September the company produced the first Commercial Amphibian flying-boat, and this was entered in the Air Ministry competition at Martlesham and Felixstowe, where it was awarded a prize of £8,000 on account of its remarkable reliability, durability of construction and excellence of design and seaworthiness.

In 1921 the Design department produced the first specially-designed Deck-landing flying-boat, which was the forerunner of the firm's well-known "Seagull" type of machine. Flying-boats of this type, and also of the Channel type Training and School machines were exported to Japan, New Zealand, Fiji Islands, Trinidad, British Guiana, Chile and Sweden.

In 1922 the "Seagull" type of flying-boat was ordered in large numbers by the British Air Ministry. In July a single-seater machine known as the "Sea Lion" was sent to Italy to compete for the Schneider Cup, and was successful at Naples in regaining this Trophy for England, being piloted by Capt. H. C. Biard.

In 1923 still further "Seagull" type machines were ordered by the Air Ministry for co-operation with Naval aircraft carriers. About the middle of the year a new type of commercial amphibian flying-boat was produced, known as the "Sea Eagle." This was entered in the King's Cup Race, and as such was the only flying-boat amphibian to take part in the competition. This type of machine was used to open the first regular flying-boat service run by the British Marine Air Navigation Co., Ltd., to the Channel Islands and France. In September the "Sea Lion," the winner of the 1922 Schneider Cup, was again entered for the race held at Cowes. No outside help or support had been forthcoming for a new racer, and in finishing third behind the American competitors a really meritorious performance was accomplished.

In November Mr. Hubert Scott-Paine entirely severed his connection with the firm in order to devote himself exclusively to the development of aerial transport in connection with the British Marine Air Navigation Co., Ltd., which company is now merged with Imperial Airways, Ltd. The whole of Mr. Hubert Scott-Paine's interests were taken over by Commander James Bird, who is the present Managing Director. The Chief Engineer and Designer is Mr. R. J. Mitchell, A.M.Inst.C.E., A.F.R.Ae.S., and the Chief Test Pilot is Captain H. C. Biard.

In 1924 considerable extensions were made for the accommodation of the largest types of flying boats. The first of these was the "Swan," which was successfully launched and flown on March 25. During the first half of 1924 twelve supermarine amphibian bombing flying-boats of a new type and design were constructed to the order of the Spanish Royal Naval Air Service, and the trials of the first of these machines, both on land and on the sea, produced most gratifying results. In the autumn the works concentrated upon a machine of an entirely new design for the Air Ministry. It was completed and delivered in the record time of 7½ months, and is a twin-engined machine, named "Southampton," after the town in which it was built, a class which has proved to be one of the most notable successes in post-war aircraft design. Since delivery of the first "Southampton" in March, 1925, cruises were carried out to the Firth of Forth and down to the Scilly Isles, which proved most successful. Later on, Sir Samuel Hoare, Sir Geoffrey Salmond, and Sir John Salmond made a flight in the "Southampton" of 2½ hours' duration, and expressed their complete approval of the behaviour of the boat, both on the sea and in the air. The factory was now fully employed on a production order from the Air Ministry for these machines

In addition to this a float-type seaplane was constructed for the 1925 Schneider Cup Race. The machine was entered as the Supermarine-Napier S.4, and set up a new speed record at Calshot on September 13, of an average speed of 226·752 m.p.h., the maximum speed on one lap being 231·406 m.p.h.

A contract was placed by the Australian Government for six of the well-known Supermarine "Seagull" fleet-spotting deck-landing amphibian flying-boats.

From September 3 to 23, four of the "Southampton" class flying-boats, in conjunction with three of H.M. ships, a cruiser and two destroyers, carried out a most successful cruise of 10,000 miles.

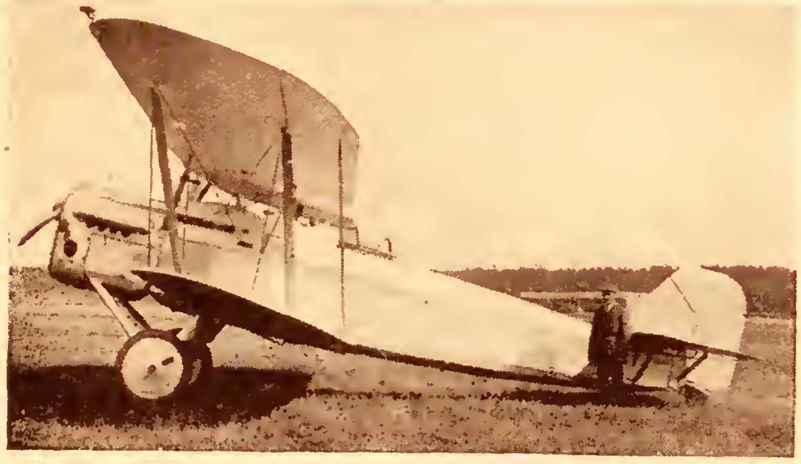
On February 6, 1926, the first Australian "Seagull" amphibian flying-boat was christened and launched by Lady Cook, D.B.E., from the company's slipway at the works.

A large triple-engined flying-boat, which will be powered with three air-cooled "Jaguar" engines, is being built to the order of the Royal Danish Naval Air Service, and a new high-speed seaplane, the successor to the S.4, is in course of construction.

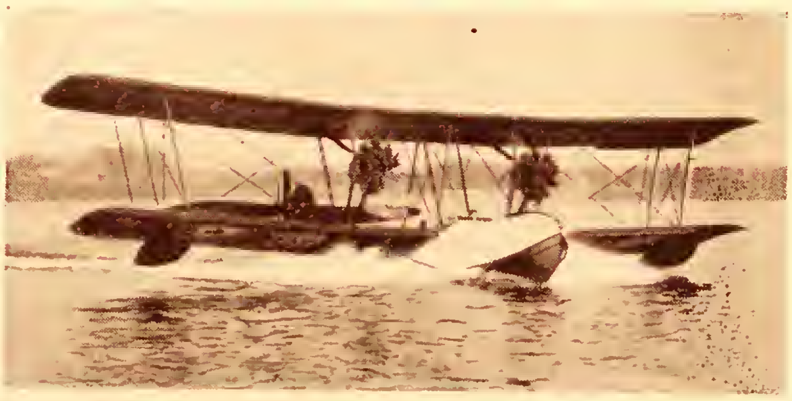
A Batch of Supermarine "Southamptons" at mooring off Cromer.

VICKERS Limited.

The wide range of Vickers' aircraft types, designed and constructed at their Weybridge factory, which adjoins Brooklands aerodrome, does not permit of more than a very brief reference to some of their most recent productions. In addition to the usual activity in the manufacture of big twin-engined machines—"Virginia" Long-Distance Heavy Night Bombers and "Victoria" 24-seater Troop Carriers, for the British Royal Air Force—Vickers, during the past 12 months, have produced several very interesting types of smaller craft. Of these, perhaps the most interesting, as being a distinct departure from normal design, is the "Vickers-Wibault" Single-Seater Fighting Scout, which is an all-metal tractor (Bristol "Jupiter") monoplane landplane, built under a novel and patented system of construction. The fuselage is a framed structure of "L" and "T" section duralumin covered with sheet duralumin, which is made rigid by longitudinal corrugations. The monoplane wing is rectangular in plan, with a recess above the cockpit; its spars are of box type, the front and rear spars being braced by a system of diagonal tubes. Ribs are formed of flat duralumin sheet pierced for lightening and riveted to the spars by small angles. Wing covering is made from thin duralumin sheet pleated for attachment to the ribs and corrugated for rigidity. All riveting is done from the outside, and in the event of damage it is thus possible to repair by riveting-on a patch. The leading edge is formed of a rolled sheet riveted longitudinally to the skin. Construction of fin, rudders, tail plane and elevator follows that of the wing. Tail adjustment gear is provided. The oleo undercarriage comprises two wheels mounted on cantilever axles which can move independently. For economy of first cost and maintenance this type of construction has many advantages to offer. A considerable number of these Scouts are being supplied to South America.



Vickers' "Vixen" Military Two-seater (Napier "Lion" Engine).



Canadian-Vickers' "Varuna" Seven-seater Seaplane (Forestry Fire Fighter).

The "Vixen" military two-seater tractor biplane has been developed considerably, many improvements being introduced in the latest examples of this class, with which several foreign Governments have equipped their air services. Originally designed for a general purpose military craft to meet British Air Ministry requirements, the "Vixen," according to the equipment carried, is adaptable either as a Two-seater Fighter, a Day Bomber, or as a Reconnaissance machine, the power unit being either a 450 h.p. Napier "Lion" motor, or a Bristol "Jupiter" of the latest type. The Vixen landplane with Napier "Lion" engine has several long-distance flights amongst its achievements, including flights of several machines from Santiago in Chile to Buenos Aires in Argentina and back, the South American High Altitude Record with a passenger, and the completion of the King's Cup Race circuit in Great Britain in 1924 and again this year. In this contest, the "Vixen" flew the course of 1,480 miles at a speed which averaged 142·2 m.p.h. for the whole distance. Another adaptation of the "Vixen" is as a float seaplane, in which form she has proved herself to possess exceedingly fine qualities, having a particularly efficient and surprisingly light system of controls giving great ease of manœuvrability both in the air and on the water. Pilots who have handled the Vixen seaplane have specially commented upon her clean running and the facility with which she takes off and alights.

The "Vendace" is another new type worthy of special mention; designed as an advanced training machine, with Rolls-Royce "Falcon III" engine, which provides a generous reserve of power, this aircraft in official trials has proved itself a highly successful deck-landing craft. The pilot who conducted her trials reported that the "Vendace" could not have better flying capabilities for deck landings; the large reserve of power makes a rapid take-off possible and makes for easy handling. Controls are amply large and at the same time light and positive in operation. It was found that there was no tendency for the machine to sway after landing on the deck and she pulled up very quickly. The "Vendace" is easily and quickly convertible from landplane form to float-seaplane.

The "Vespa" (Bristol "Jupiter" engine) has been specially designed for reconnaissance work, and is one of the finest examples of this class of aircraft available at the present day, possessing all those qualities which are necessary for reconnaissance duties, viz.: a very quick take-off, a very low landing speed, a high service ceiling, a steep gradient of climb.

A brief mention should be made of the two seaplanes designed and constructed in Montreal by Vickers' Canadian branch (Canadian Vickers, Ltd.). The "Vedette" was the first to be turned out; this is a three-seater boat seaplane, designed especially for forestry patrol for duty on the Canadian lakes and waterways. This type, of which several examples have been built with different types of power unit, has been particularly successful. The second is the "Varuna," a seven-seater boat seaplane with twin radial engines, having generous accommodation for the stowage of the equipment of the Forestry fire fighters, for the transport of whom from their base to the scene of operations this type has been specially designed.

It is some fifteen years since Vickers became actively engaged in the production of aircraft, and during this period they have manufactured successfully every class of machine from the smallest to the largest, for every purpose—naval, military and civil.

Some data concerning the types mentioned above are contained in the following table:—

Type.	Motors.	Class.	Height. ft in.	Length. ft. in.	Span. ft. in.	Weight. Bare.	Weight. Laden.	Speed. Full. m.p.h.	Duration Min. m.p.h.	Duration Cruising. Miles.	Climb. Minutes to Heights.
Virginia ..	2 Lions ..	Bomber, heavy	18 4	51 9	86 6	9,860	16,750	108	46	985	15 mins. to 1,500 m.
Victoria ..	2 Lions ..	Troop carrier	17 3	51 7	86 6	10,155	18,100	104	48	400	20 mins. to 1,500 m.
Wibault ..	1 Jupiter..	One-seater scout	10 3	25 6	36 1	1,973	3,060	139 at 4,500 m.	48	600	12·5 mins. to 4,500 m.
Vendace Landplane	1 Falcon..	Two-seater training and deck landing	12 7	32 3	44 7	2,626	3,500	118	—	510	—
Vespa ..	1 Jupiter..	Reconnaissance	10 3	31 3	50 0	2,387	3,900	115	44	415	19·5 mins. to 4,500 m.
Vedette ..	1 Falcon ..	Three-seater seaplane ..	11 9	34 0	42 0	2,436	3,480	110	45	460	8 mins. to 1,500 m.
Vixen ..	1 Lion ..	Landplane, heavy ..	13 0	32 9	45 1	3,338	5,550	126½	51	750	16 mins. to 3,000 m.
Vixen ..	1 Lion ..	Landplane, light	13 0	32 9	45 1	3,338	5,000	130 at 3,000 m.	48	515	13½ mins. to 3,000 m.
Vixen ..	1 Lion ..	Seaplane, naval reconnaissance	14 1	36 9	45 1	3,888	5,550	117 at 3,000 m.	51	455	18 mins. to 3,000 m.

WESTLAND AIRCRAFT WORKS.

WESTLAND CO.

The Westland Aircraft Works came into existence in 1915 when the exigencies of the time decided the directors of Petters, Ltd., of Yeovil, to offer the services of their firm to the Admiralty. Their offer was accepted, and they were asked, in addition to prosecuting the manufacture of oil engines for camp and ship lighting, as well as lorry components and shells, to prepare for aircraft construction on an expanding basis. For this purpose the present aircraft branch of Petters, Ltd., was formed.

The organisation was entrusted to Mr. R. A. Bruce (then Lieut., R.N.V.R.), who was released by the Admiralty for this purpose in July, 1915.

Work commenced at once. Premises had to be built, machine tools installed, and an entire new staff and work-people recruited; but, in spite of this, in January, 1916, the first seaplanes—Short 225 Sunbeams—were delivered to the Government. The first contracts were entirely confined to seaplanes, but later Sopwith 1½ Strutters and D.H.4 Rolls-engined aeroplanes were ordered. During the course of the year, therefore, the premises of the factory were increased, in order to cope with the growing volume of work with which the firm was being entrusted. Additional land attaching to the works was acquired for the purpose of laying out an aerodrome.

It is interesting to observe that up to this point the main activities of the firm had been directed towards construction and assembling as opposed to design, for they had been provided with drawings and schedules that were very complete. When, however, the "Liberty" engines began to be delivered in increasing numbers in this country, it became necessary to re-design machines for this purpose. The Westland aircraft firm had recently made a large batch of D.H.9 machines, and the Aircraft Manufacturing Company were in process of re-designing these to accommodate Rolls-Royce engines. In order to liberate the Aircraft Manufacturing Company for the completion of the production drawings of the twin-engined D.H.10 aeroplanes, the Westland Aircraft Works were entrusted with the completion of the production drawings of the D.H.9A machines, and were made responsible for designs and modifications of all D.H.9A work from that date. From the drawings thus produced by the firm a large number of other contractors built aeroplanes of this type, and very large numbers were turned out by the Westland Aircraft Works prior to the Armistice.

In the meanwhile the Air Ministry were asking for designs of certain types of fighting scout seaplanes, two examples of which—N.16 and N.17—were designed by the firm. These were succeeded by a single-seater land fighter, and two-seater land fighter—the Westland "Wagtail" and Westland "Weasel" respectively. These were originally designed for the A.B.C. "Wasp" and the "Dragonfly" engines, but later were replaced by the "Lynx" and the "Jupiter" or "Jaguar" respectively.

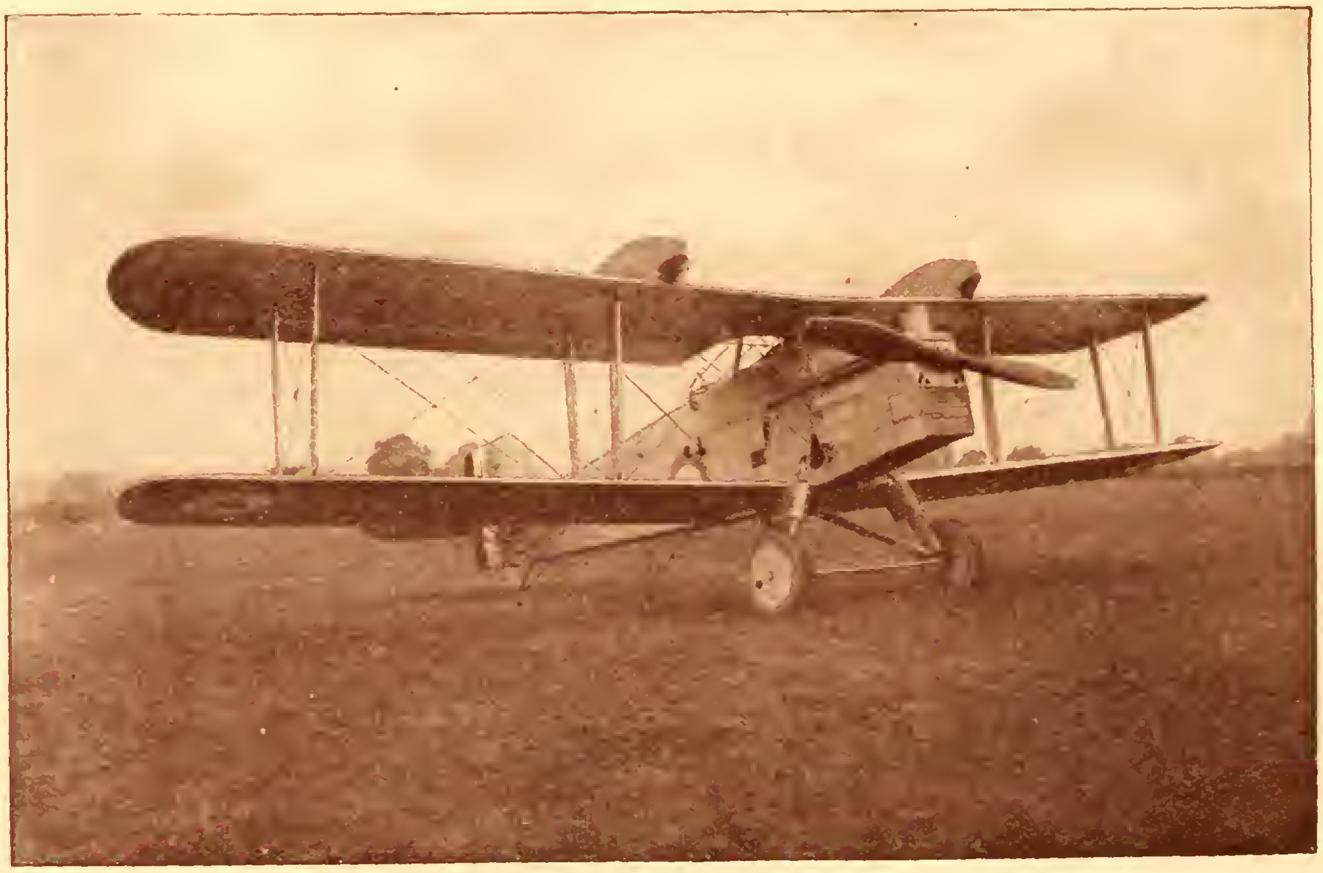
With the Armistice, attention was immediately turned to the design of a reliable commercial aeroplane, and by July, 1919, the first Westland limousine was in the air. This was purely a commercial machine, designed and built throughout for passenger and goods carrying, and was one of the very earliest machines of this type as compared with the adapted war machines. These machines gave excellent service, and were used in this country on the London-Paris service, and also for special work abroad. In 1920 the Air Ministry held a competition for civil aircraft, and an enlarged edition of the Westland limousine fitted with Napier "Lion" engine was designed and built for the competition and won the first prize of £7,500 for the Commercial Aircraft, Small Class. This machine accommodated five passengers and luggage in addition to the pilot, and had a maximum speed of 118 m.p.h. When the British Government held their Light Aeroplane Competition the firm produced the Westland "Wood Pigeon," which was a highly successful example of its class.

The Westland Aircraft Works progressive policy has been maintained. They are continually at work experimenting on the efficacy of new designs, and a 4-ft. wind channel has been constructed with this end in view.

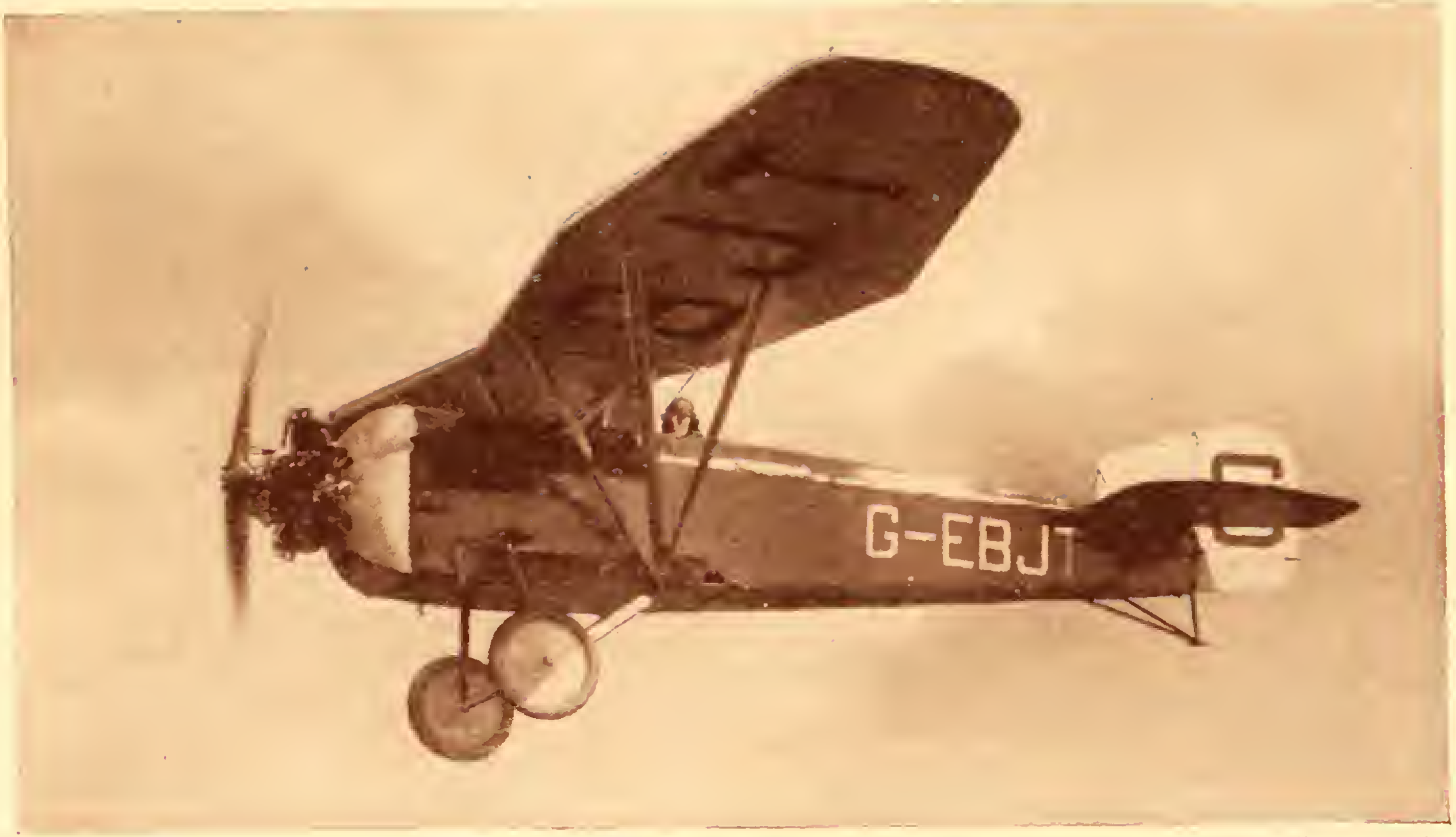
Governmental work and experimental work, therefore, is the present field of activity of the company. They have increased their scope in the latter section by securing the services of Capt. Hill, who is perfecting his designs for the new "tailless aeroplane." A light aeroplane of this class has already been built, and its trials were attended by remarkable success, for Capt. Hill flew the machine in altitudes that would have made other aeroplanes uncontrollable. Considerable experimental work is, however, necessary in order to demonstrate the possibility of this design for greater wing loading and higher speeds, and new designs based on such requirements are being completed so that experimental machines may be tested out on the Westland aerodrome.

Amongst other machines produced at the Westland Aircraft Works is the Yeovil day bomber.

It marks an important stage in the development of this



The Westland "Yeovil."



["Flight" *Photograph*

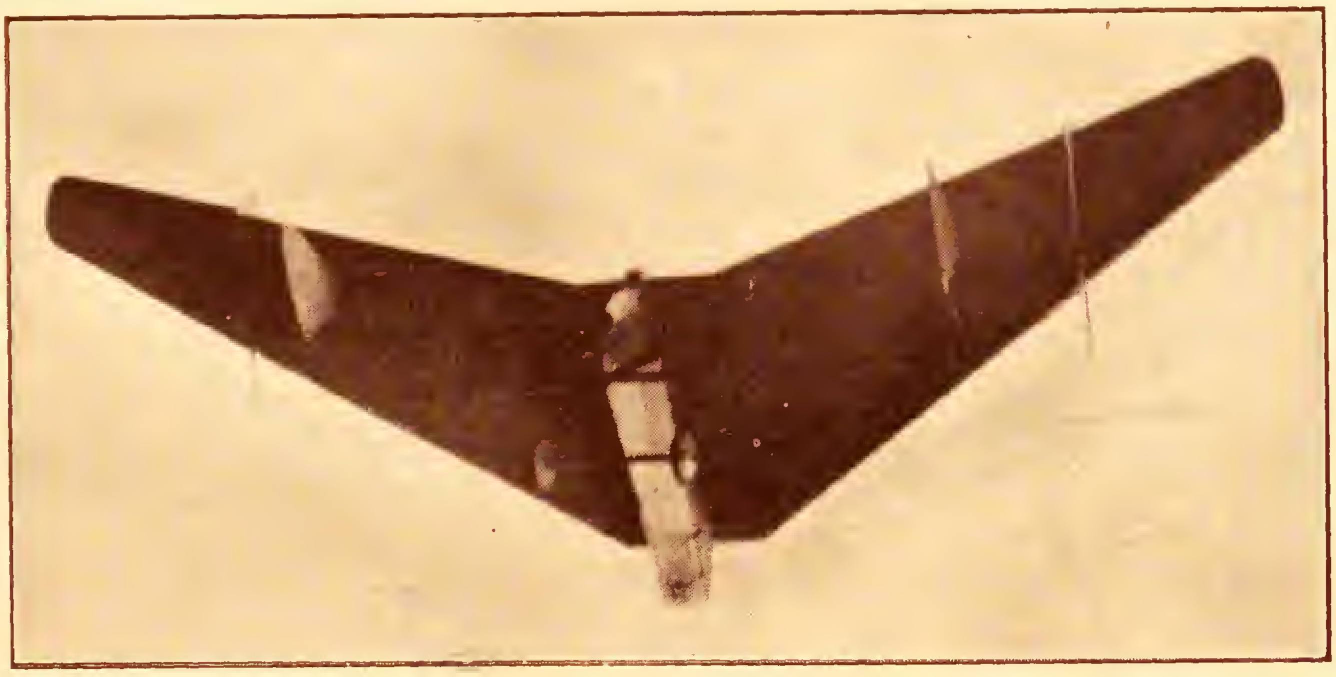
The Westland "Widgeon."

type of aircraft as it possesses great stability, gravity feed of petrol from tanks in the upper plane, and oleo-rubber undercarriage with wide track. It has a Rolls-Royce "Condor" engine of 670 h.p., with a Leitner-Watts metal propeller. The performance of the machine, which was built for the Air Ministry, is highly satisfactory.

Among the firm's experimental projects is an interesting single-seater fighter. The machine is a monoplane capable of very high performance. It is not being built to any Air Ministry specification, but purely as a private venture, and has many novel features. The first machine should be in the air shortly.

A good deal of work has also been done on developing the light aeroplane, and during the last three years several light machines have been built, chiefly with the idea of obtaining the necessary data to turn out a commercial machine of robust construction and particularly suitable for the owner-pilot. An improved model of the Westland "Widgeon" light aeroplane now being developed will be an ideal machine for use in the Dominions—easy to fly, simple to maintain, cheap to run, easy to get in and out of, with an excellent view for pilot and passenger.

This, then, is a brief sketch of the activities of the firm which established Yeovil as the principal air centre of the West of England, a fact that was demonstrated very forcibly during the general strike, when its organisation was at the disposal of a committee formed for the distribution of newspapers by air to all parts of England.



THE BOOMERANG : Plan view, from below, of Capt. Hill's tailless aeroplane "Pterodactyl." This view was secured with the camera pointing almost vertically upward.

The first product of this firm, the five-engined sea-going flying-boat *Richard-Penhoët*, was launched last summer at St. Nazaire, and has since been undergoing flying tests. These have, on the whole, been very satisfactory, considering that this huge machine, which weighs fully loaded 18 tons, is not only the first seaplane ever built by this firm, but that it also incorporates a great variety of novel ideas which will, naturally, take some time to "reduce to practice." Hence M. Richard deserves sincere congratulations on having carried a bold idea into the realm of practice.

The *Richard-Penhoët* is, as our photograph shows, a thick-wing, cantilever, monoplane flying-boat which is fitted with five 420 h.p. Gnôme-Rhône "Jupiter" engines driving tractor airscrews. An idea may be had of the bigness of this seaplane by looking at the relative size of the engines, which appear as mere toys against the enormous wing, which has a maximum depth of 1·80 m.

The framing of the wings is of timber, reinforced with stiffeners of high-tensile steel. The hull is likewise of timber construction. The internal arrangement includes two decks. The pilot's cockpit is situated between the wings, near the leading edge.

As this machine is mainly considered as an experimental type, no definite commercial or military equipment has as yet been provided for it, though its great weight-lifting qualities make it particularly adaptable to transport and long-range reconnaissance work.

Specification.—Engines, five 420 h.p. Gnôme-Rhône "Jupiter"; span, 40 m.; length, 27 m.; maximum wing chord, 9 m.; maximum wing depth, 1·80 m.; height of hull, 4 m.; beam of hull, 4 m.; weight empty, 13,000 kg.; weight loaded, 18,000 kg.; maximum speed, sea level, 157 km.p.h.

Owing to its size, it has been found impossible to bring the *Richard-Penhoët* into the Grand Palais; however, no visitor to the Salon will be allowed to ignore its existence, for the St. Nazaire Co. will exhibit a photograph of truly heroic size, 38 m. long by 8 m. high, showing the big flying-boat in almost life-like proportions.

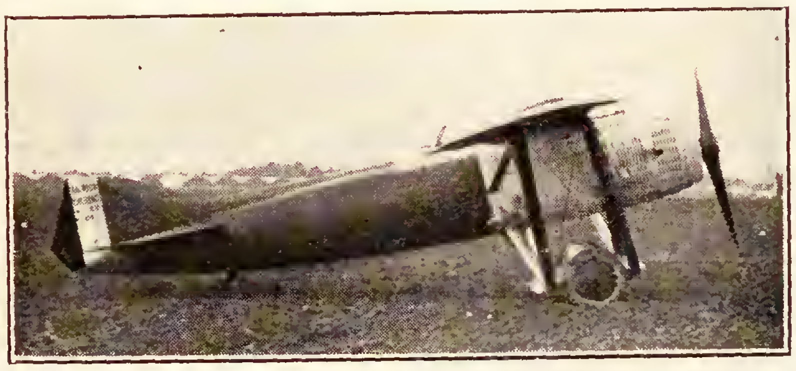
The St. Nazaire firm will also exhibit a turntable catapult launching gear for naval aircraft, which was recently tested, with satisfactory results, by the French Navy at St. Nazaire. This catapult is operated by compressed air and gives the machine to be launched a flying-off speed of 80 km.p.h. The overall length of the catapult is 20·25 m.

SALMSON-BECHEREAU (S.R.A.P.)

The S.R.A.P. (*Société pour la Réalisation d'Avions Prototypes*) is a new firm with offices in Paris, which has secured the technical services of M. Béchéreau, the well-known one-time designer of the Deperdussin and Spad aeroplanes.

The S.R.A.P. will exhibit a Salmson-Béchéreau C.2 two-seater fighter (500 h.p. Salmson C.18), the fuselage of a Béchéreau mail aeroplane, a Béchéreau shock-absorbing system for Goliath aeroplanes, and a patented joy-stick.

The Salmson-Béchéreau C.2 Two-Seater Fighter.—The Salmson-Béchéreau Two-seater fighter is a strut-braced monoplane, having two outer wing struts, which are fixed to the undercarriage and an intermediate Warren truss. The construction is of conventional lines, consisting essentially of a wire-braced timber framework. The wing struts are faired steel tubes. The wing is covered with fabric except at the leading edge, where multi-ply is used to give added strength. The fuselage is built up on four main longerons and plywood formers, over which a false work of spruce stringers is fixed to give the fuselage a good streamline. The engine compartment as well as the pilot's cockpit are covered with sheet aluminium; the rest of the fuselage as well as the tail unit are fabric-covered. The under-carriage struts are plywood frames of U type.



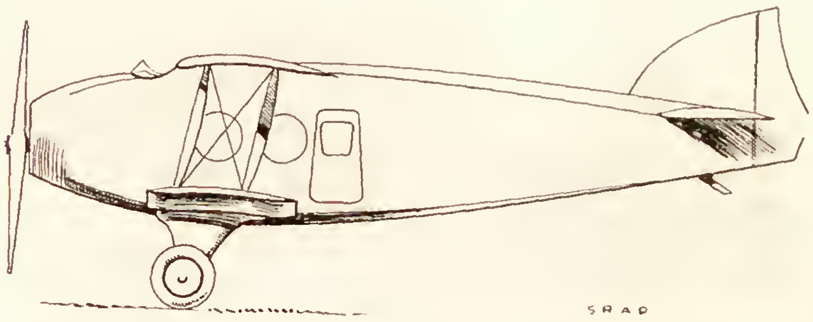
The Salmson-Bechereau C.2 two-seater fighter with 500 h.p. Salmson.

Specification.—Engine, 500 h.p. Salmson C.18; span, 14·60 m.; length, 10 m.; height, 3 m.; wing area, 35 sq. m.; weight empty, 1,558 kg.; fuel load, 292 kg.; crew (two), 160 kg.; armament and equipment, 350 kg.; weight loaded, 2,360 kg.

Official Performances (S.T.Aé. Tests)

Altitude:	3,000	4,000	5,000	6,000	6,700
Speed, km. p.h. ..	220	215	209	200	—
Climb, mins... ..	9′	13′ 51″	20′ 12″	31′ 40″	47′ 38″

Ceiling, 7.150 m.



The Salmson-Bechereau SRAP Commercial Aeroplane with 500 h.p. Salmson engine.

The Salmson-Béchéreau Mail Aeroplane.—The Salmson-Béchéreau mail aeroplane, of which only the fuselage will be exhibited at the Salon, is a two-bay biplane of timber construction fitted with the 500 h.p. Salmson engine. The wings have a negative stagger and the bottom wing has a greater span than the top wing. The fuselage fills out the entire gap of the wings. The pilot's cockpit is situated ahead of the leading edge of the top wing. The cabin of this machine, which has not yet undergone official flying tests, is designed to accommodate seven passengers.

Specification.—Engine, 500 h.p. Salmson C.18; span, 16·90 m.; length, 10·70 m.; height, 3·60 m.; wing area, 60 sq. m.; weight empty, 1,840 kgs.; fuel load, 600 kgs.; crew (one), 80 kgs.; passengers (seven), 560 kgs.; luggage, 440 kgs.; weight loaded, 3,520 kgs.; maximum speed (designed), 190 km. p.h.; range in still air, 800 kms.

SCHRECK—F.B.A.

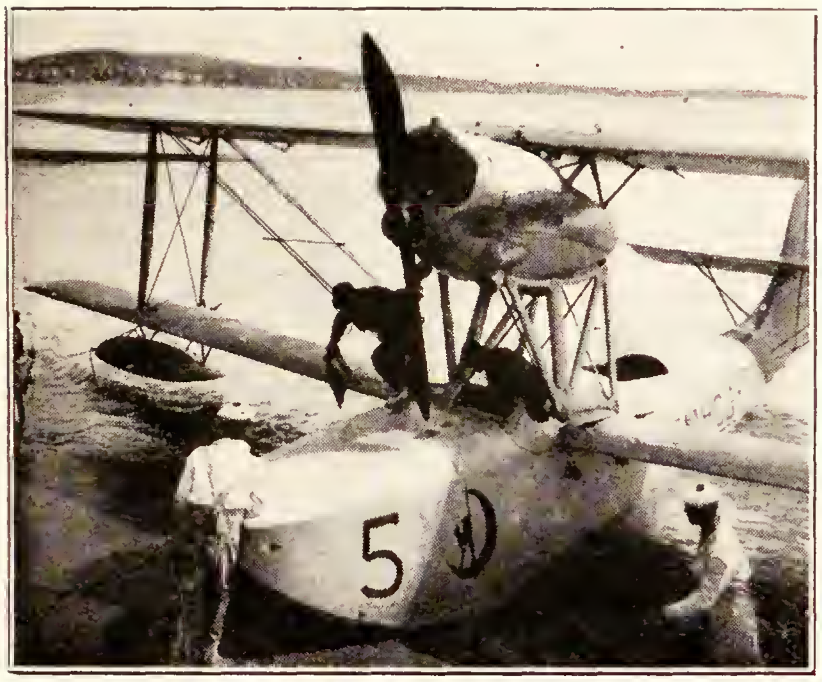
The F.B.A. Company (Louis Schreck, *constructeur*) is the oldest seaplane constructing firm in France, and one which has specialized on flying-boats ever since 1912. Since the war a very satisfactory retractable landing gear for flying-boats has been developed, and this can be fitted to all the F.B.A. types of flying-boat save the school machine.

The exhibit of the company consists of an F.B.A. type 21 HMT-6 transport amphibian flying-boat, which is fitted with a 450 h.p. Lorraine-Dietrich engine. It was this type of machine which won the *Grand Prix des Hydravions de Transport* of 1925 and which established the world's seaplane altitude record with 1,000 kg. of ballast.

The F.B.A. 21, which is shown in the accompanying photographs with the retractable landing gear removed, is a single-bay biplane flying-boat of particularly clean and pleasing lines, the excellent streamlining of the hull and of the engine nacelle being specially worthy of note. The construction is of the conventional type, incorporating a multiply-planked hull and wire-braced timber wing frames. The interplane and engine struts are likewise of timber, but the cabane, as well as the wing-tip float and tail-plane bracing struts, are of steel tubing. The wings and the tail surfaces, with the exception of the vertical fin, are fabric covered. The vertical fin, which is built integral with the hull, is covered with plywood.

The F.B.A. 21 (the initials H.M.T. meaning *hydravion mixte de transport*) shown at the *Salon* will be equipped as a transport seaplane accommodating four passengers in an open cockpit behind the bottom wing—a position which most passengers will undoubtedly prefer to that given them on most other flying-boats where they are seated in the bows and so contribute to the shock absorbing qualities of the machine in case of a crash. The pilot's cockpit, containing two seats with dual control, is located flush with the leading edge of the bottom wing, where he is afforded an excellent range of vision.

Specification.—Engine, 450 h.p. Lorraine-Dietrich; span (top wing), 15·40 m.; span (bottom wing) 14·40 m.; length, 10·56 m.; height, 4·20 m.; wing chord, 1·90 m.; interplane gap, 2·40 m.; total wing area, 53·5 sq. m.; weight



The F.B.A. 21 HMT-6, with 450 h.p. Lorraine, is a transport amphibian flying boat

empty, 1,820 kg. ; weight of fuel, 423 kg. ; weight of crew (2), 160 kg. ; pay load, 437 kg. ; weight loaded, 2,840 kg.

Official Performances (S.T.Aé. Tests)

Altitude	1,000 m.	2,000 m.	3,000 m.	4,000 m.
Speed, km.p.h.	186	181	175	168
Climb, mins.:	5 mins. 30 secs.	14 mins. 30 secs.	30 mins.	56 mins.

Service ceiling, 4,400 m. ; range in still air, 600 km. unstick time on water, 22 secs. ; unstick time on land, 18 secs.

The F.B.A. 21 can also be equipped as a reconnaissance bomber or as an ambulance seaplane. In the latter form the machine accommodates in addition to the crew two stretcher cases and a hospital attendant.

S.E.C.M.

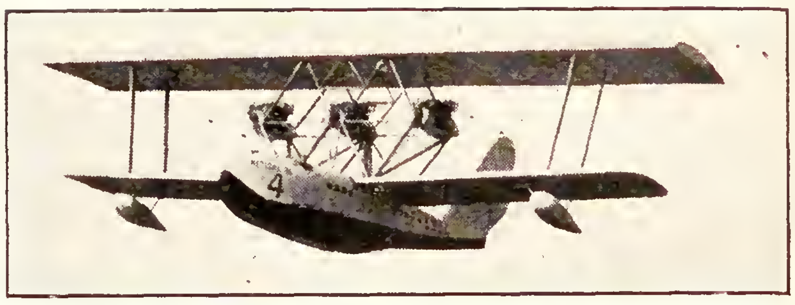
The S.E.C.M. company (*Société d'Emboutissage et de Constructions Mechaniques*) will exhibit two aeroplanes at the Salon. One will be the S.E.C.M.-Amiot 120 B.N.2, a two-seater night-bomber with 600 h.p. Renault engine on which Pollon, Van Caudenberg and Amaurich made an attempt early in the autumn to beat the world's straight-line distance record. The other will be the new type 150 three-engined commercial aeroplane, which may be fitted with either 300 Renault or 350 Hispano engines. Both machines are of all-metal construction, the material used being mostly duralumin, of the form developed by this firm during the last five or six years, and which has been illustrated in Flight on several occasions.

Specification of S.E.C.M.-Amiot 120 *B.N.*2 :—Engine, 600 h.p. Renault. Span, 19·0 m. ; length, 14·0 m. ; wing area, 85 sq. m. ; weight empty, 1,760 kgs. ; weight loaded, 3,400 kgs. Maximum speed at ground level, 200 km./hr. ; climb, 5,000 m. in 45 mins.

The S.E.C.M. 150 *T* is a cantilever monoplane, with one central engine in the nose of the fuselage and two wing engines. The two latter are accessible during flight, it being possible for the engineers to get to them through the thick wing. The cabin has accommodation for 14 passengers, and the power reserve is such that the machine will fly on any two of its three engines. With one engine it loses height very slowly. Following is a specification of the 150 T. : Span, 23·9 m. ; length, 18·0 m. ; wing area, 100 sq. m. ; weight equipped, 4,030 kgs. ; pay load, 1,680 kgs. ; speed at ground level, 235 km./hr. ; cruising speed, 190 km./hr. ; range (in still air), 1,000 kms.

S.P.C.A.

The S.P.C.A. firm (*Société Provençale de Constructions Aéronautiques*) which was established last year is the aircraft establishment of the big shipbuilding firm of *Société Provençale de Constructions Navales*, with shipyards at La Ciotat, near Marseilles, where the aircraft works of the S.P.C.A. are also located. The latter company was more particularly created for the purpose of producing a type of aircraft that has not received much attention in France so far—that is, a multi-engined flying boat for commercial service, in particular on the trans-Mediterranean routes. French shipping circles are beginning to take a serious interest in commercial sea-flying, which, they realise, must sooner or later supplement their own surface services. As the parent firm of the S.P.C.A. is closely allied with the *Messageries Maritimes* shipping line, and the latter is also a big shareholder in the new *Compagnie Aérienne France-Afrique* that was recently formed with the participation of the Latécoerè Air lines for the purpose of establishing flying boat services between France and North Africa, the products of the S.P.C.A. will be watched with much interest.



THE S.P.C.A. "Meteore-63 is a three-engined commercial flying boat, with 180 h.p. Hispano engines. Only a scale model will be exhibited.

The S.P.C.A. will exhibit at the *Salon* a scale model of its Météore-63 type commercial flying boat, fitted with three 180 h.p. Hispano-Suiza engines, with which the Latécoère Air Lines are at present conducting an experimental mail service between Marseilles and Algiers. It will be remembered that it was this machine, piloted by the veteran Burri, which won the Commercial Seaplane Competition organised by the French Under-Secretariat for Aeronautics last summer. The Météore-63 is incidentally the first French transport seaplane that has obtained a first-class airworthiness certificate from the Bureau Véritas.

The Météore-63 is a triple-tractor, biplane flying boat of conventional construction, timber being used throughout except for the bracing struts of the engine group, which are steel tubes, and for the various fittings, which are mostly steel stampings. The wings are fabric-covered.

The hull comprises two compartments, one for six passengers being located just aft of the pilots' cockpit, and the other, aft of the lower wings, for mails and goods. The passenger cabin is electrically heated.

Specification of the Météore-63 *Flying Boat.*

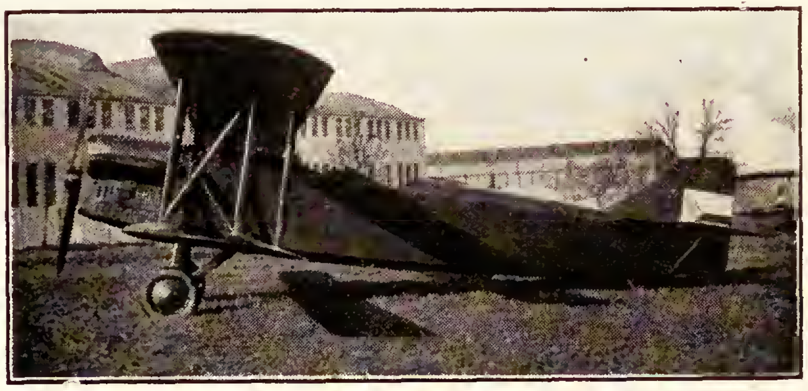
Engines, three 180 h.p. Hispano-Suiza ; span, 20·0 m. ; length, 13·0 m. ; height, 5·21 m. ; wing area, 103 sq. m. ; weight, empty, 3,400 kg. ; fuel and useful load, 1,830 kg. ; weight, loaded, 5,230 kg. ; max. speed, 167 km.p.h. ; cruising speed, 140 km.p.h. ; min. speed, 80 km.p.h. ; service ceiling, 4,000 m. ; cruising range, 7½ hrs. ; safety factor, 6.

VOJENSKA TOVARNA NA LETADLA

The Military Aircraft Factory of Prague, whose chief designer is M. Smolik, will be represented by no less than three complete aeroplanes—the S.16, the S.18, and the S.20.

The Vojenska S.16 is a long-distance reconnaissance or day-bombing biplane characterised by single-bay wing bracing in spite of a considerable wing span. It is fitted with a 450 h.p. Lorraine-Dietrich engine, but can also be supplied with Napier "Lion," Hispano-Suiza, Renault, or B.D.

The machine is of all-metal construction, except for the covering, which is fabric. The fuselage is of steel-tube construction, joined together in two places to form three separate sections—the engine bearers, the cockpit portion, and the rear portion. The petrol tank is placed inside the fuselage, and is stated to be protected by a rubber covering,



The Vojenska S.16 long-distance reconnaissance biplane with 450 Lorraine-Dietrich.

Schneider Cup Victor Now Breaks World's Seaplane Record

258 miles per hour on SHELL

On the heels of the Schneider Cup Victory, comes the news that the winner, Major Mario di Bernardi, has now broken the World's Seaplane Record, using Shell Aviation Spirit. Over a 3 kilometre course at Norfolk, Virginia, U.S.A., he attained an average speed of 258.873 m.p.h.—a wonderful performance—beating the previous record by 13 m.p.h.

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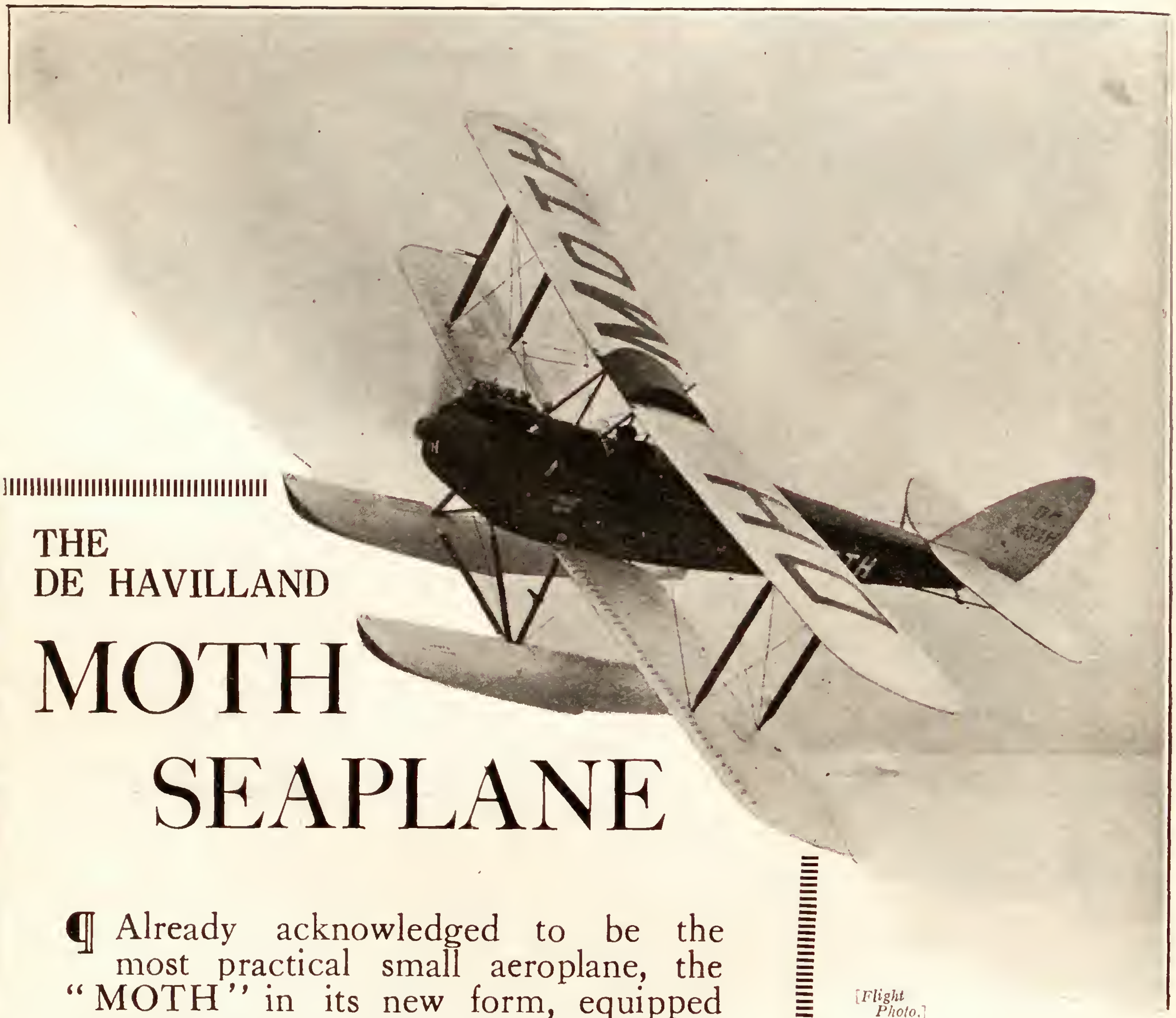
Shell Oil, too, has similar successes to its credit—the most recent being the achievement of an Imperial Airways machine, which completed 60,000 miles on **ordinary** *Triple Shell Oil without the necessity for decarbonising.*

SHELL
Aviation Spirit



[Flight Photo.]

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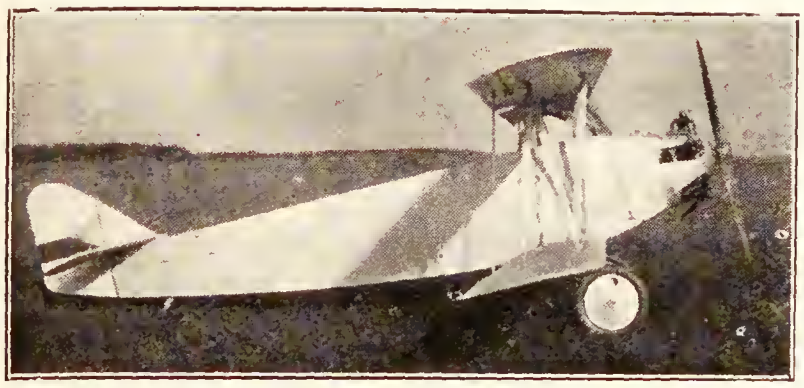
apparently somewhat after the style of the Imber self-sealing tank. This tank has a capacity of 400 kg. A gravity tank holding 174 kg. is placed in the top centre section. This quantity of fuel suffices for a flight of five hours' duration at full throttle. The armament consists of one fixed Vickers gun, and two Lewis guns on the usual gun ring. The wings are of Duralumin construction.



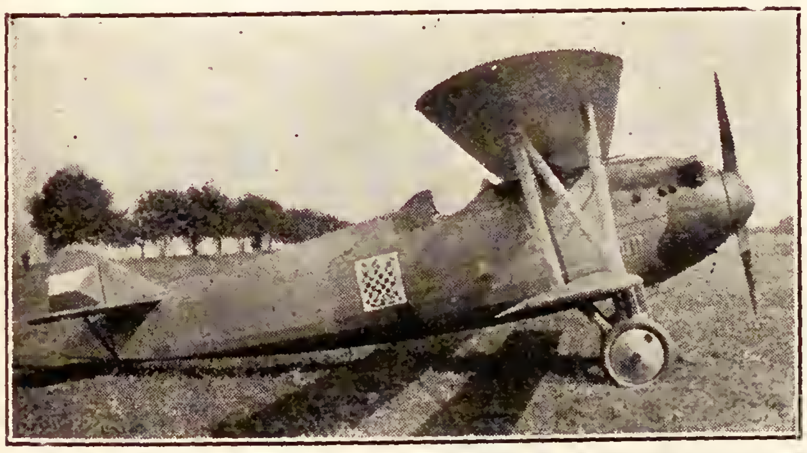
The Vojenska S. 18 is a school machine with 60 h.p. Walter Engine.

Following are the main characteristics of the Vojenska S.16: Wing span, 15·5 m.; length overall, 9·2 m.; wing area, 47 sq. m.; weight, empty, 1,200 kg.; load, 1,050 kg. (military load, 448 kg.); total loaded weight, 2,250 kg. Top speed at ground level, 225 km./h.; speed at 5,000 m., 194 km./h.; service ceiling, 6,500 m.; range, 1,237 kms.

*The Vojenska S.*18 is a school machine fitted with 60 h.p. Walter radial air-cooled engine. It is, as distinct from the S.16, of wood construction. The biplane wings are of normal form and construction, and the fuselage is of the plywood-covered box type. The wing bracing is a little unorthodox in that on each side a pair of Vee struts run from the bottom front spar root to points on both top spars. Thus the usual rear inner interplane strut is missing. The top plane, incidentally, is in one piece and has no dihedral. The petrol tank, with sufficient petrol for 2½ hours, is housed in the top plane, giving direct gravity feed. It is understood that although this is a school machine, it has been built with sufficiently high factors of safety to permit of its being stunted in every way.

*Characteristics of the S.*18.—Wing span, 10 m.; length overall, 6·682 m.; wing area, 17 sq. m.; weight, empty, 254 kg.; fuel, 40 kg.; crew, 160 kg.; total loaded weight, 554 kg. Speed at ground level, 140 km./h.; landing speed, 68 km./h.; climb to 1,000 m. in 6 mins.; Service ceiling, 3,500 m.

*The Vojenska S.*20 is a single-seater fighter fitted with a 300 h.p. Hispano-Suiza engine. The wing design and construction are normal, the machine having a top plane of slightly greater span and chord than the bottom, in order to improve the visibility. Wood construction is employed in the wings, and ailerons are fitted to the lower wing only.



The Vojenska S. 20 single-seater fighter with 300 h.p. Skoda-Hispano.

The fuselage is of steel-tube construction, specially designed to facilitate repairs. The engine bearer is of steel tube and Duralumin, and supports a Skoda-built Hispano-Suiza of 320 h.p. at 1,800 r.p.m. The petrol tank, with a capacity of 215 litres, or sufficient for 2¼ hours, is contained inside the fuselage. The tank is protected by a rubber jacket. A service tank in the top plane has a capacity of 35 litres, or sufficient for 22 minutes at full throttle. Two Vickers guns lie above the engine, and are fired from the control stick. The S.20 is also equipped with a Heineke parachute. The Lamblin radiators are fitted to the undercarriage legs.

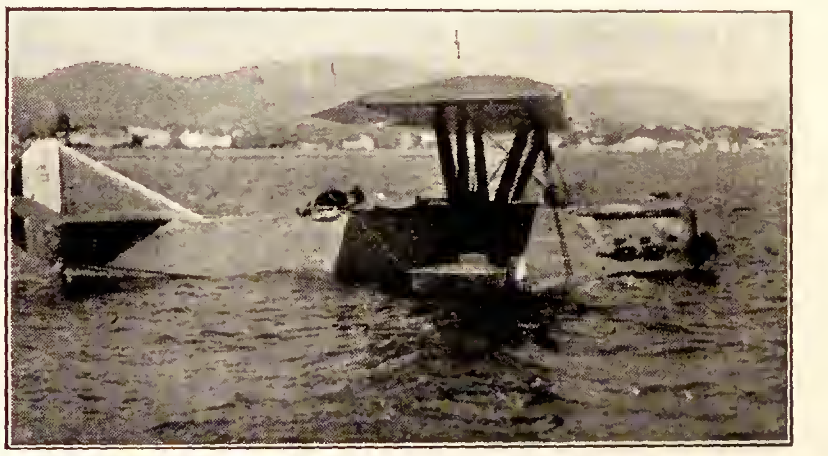
*Characteristics of the Vojenska S.*20.—Span, upper plane, 9·7 m.; lower plane, 8·2 m.; length overall, 7·441 m.; wing area, 18·4 sq. m.; weight, empty, 728 kgs.; useful load, 145 kgs.; fuel, 175 kgs.; total loaded weight, 1,048 kgs. Speed at ground level, 257 km./h.; speed at 2,000 m., 261 km./h.; climb to 1,000 m. in 1·5 mins.; to 5,000 m. in 13·8 mins.

VILLIERS

THE exhibit of the François Villiers Company will consist of a Villiers type II naval two-seater fighter aeroplane (*avion marin*), with 450 h.p. Lorraine-Dietrich engine, and of a Villiers type V two-seater night fighter, also with 450 h.p. Lorraine-Dietrich engine.

The Villiers Type II Naval Two-Seater Fighter.—The Villiers type II naval two-seater fighter was specially designed for fighting heavy flying-boats with the advantage of incorporating the features of a landplane but having at the same time the ability of alighting safely on water. In other words, the Villiers II is a "seagoing aeroplane," which is particularly adapted to use on board aircraft carriers.

The fuselage is of the water-tight type, being constructed on the lines of a flying-boat hull, with timber framing. The wings, which are also timber-framed, are of the sesquiplane type, with Vee interplane struts. The bottom wing, which is mounted midway up the fuselage depth, carries wing tip floats. The undercarriage may be dropped by the pilot for alighting on the sea. For landing on the deck of aircraft carriers, the machine incorporates an arresting gear which engages with the transverse wires of the deck.



The Villiers Type II, 450 h.p. Lorraine, is a landplane capable of floating after a descent on the sea. It then has to be hoisted on board a vessel.

The petrol tank is equipped with an instantaneous emptying device, which is operated by carbonic acid contained in a bottle.

The armament consists of two synchronised Vickers guns and two Lewis guns on ring mounts.

Specification.—Engine, 450 h.p. Lorraine-Dietrich; span, 13·00 m.; length, 9·46 m.; height, 3·68 m.; wing area, 40 sq. m.; weight, empty, 1,565 kg.; fuel load, 235 kg.; useful load, 250 kg.; weight, loaded, 2,050 kg.; maximum speed, sea level, 218 km.p.h.; speed at 5,000 m. altitude, 202 km.p.h.; speed at 6,000 m. altitude, 196 km.p.h.; climb to 6,000 m. altitude, 29 mins.; theoretical ceiling, 6,250 m.

The Villiers Type V Two-Seater Night Fighter.—The Villiers type V Two-Seater Night Fighter, fitted with the 450 h.p. Lorraine-Dietrich engine, is a single-bay biplane of timber construction. The wings are fabric-covered and the interplane struts are faired duralumin tubes, which are fitted with an adjusting device for length. The cabane struts, of the diverging (outward sloping) type, are steel tubes. The fuselage is built along the lines of the Villiers type II, that is, with a water-tight hull arrangement. The engine bearers are duralumin box girders. Radiators are of the Lamblin 1925 type. The petrol tank may be jettisoned in flight. The undercarriage is rubber sprung.

The armament consists of two fixed Vickers gun and two flexible Lewis guns. The equipment includes a heating arrangement for the armament and the crew, landing flares and searchlight, Michelin bomb release and wireless outfit.

Specification.—Engine: 450 h.p. Lorraine-Dietrich. Span: 12·00 m. Length: 8·750 m. Height: 3·300 m. Wing area: 40 sq. m. Weight, empty: 1,274 kg. Useful load:

465 kg. Fuel load: 366 kg. Weight, loaded: 2,105 kg. Maximum speed, sea level: 224 km.p.h. Speed at 4,000 m. altitude: 210 km.p.h. Min. speed: 92 km.p.h. Climb to 6,500 m.: 43 mins. Service ceiling: 7,000 m.

WIBAULT

M. Michel Wibault is the great French specialist of all-metal aircraft construction whose name has now for several years past been associated with the production of military aeroplanes of the strut-braced parasol monoplane type. The novelty of many of his ideas has somewhat handicapped him in military circles until recently, when the sheer merit of his designs brilliantly asserted itself at the recent French competition for single-seater fighters, as a result of which a series of Wibault 7 C.1 fighters were ordered by the French Air Service. This type is also being constructed for the Chilian Air Service by Vickers, Ltd., under licence from M. Wibault.

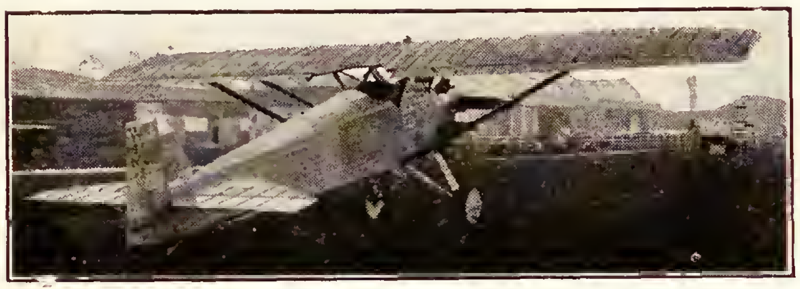
It is this type of aeroplane which will be exhibited at the Wibault stand. The Wibault 7 C.1 is entirely built of duralumin, the fuselage being built up of angle sections and strips while the wings have duralumin tube spars and ribs of the same alloy. Both the wings and the fuselage are covered with sheet duralumin, which is applied in small strips and secured to the framework with a patented metal seam. This construction allows of rapid and easy repairs.

The landing gear is of the axle-less type with oleo-pneumatic shock-absorbers.

The engine is a 420 h.p. Gnôme-Rhône Jupiter.

The performances, weights, etc., given hereafter include the full military equipment, namely, two wing guns firing over the propeller, two fuselage guns synchronised with the engine, 2,000 rounds of ammunition, oxygen inhalator, fire extinguisher, self-starter, electrical equipment, parachute, camera and signal apparatus.

The fine visibility and the low landing speed of this machine make it also a desirable type for photographic work as well as for night reconnaissance and fighting.



THE WIBAULT 7 C.1, with "Jupiter" engine, is a single-seater fighter of all-metal construction. Vickers, Ltd., have built a number of these machines for the Chilean Government.

Specification of the Wibault 7 C.1 Fighter

Engine, 420 h.p. Gnôme-Rhône Jupiter; span, 11·0 m.; length, 7·450 m.; height, 2·90 m.; wing chord, 2·10 m.; wing area, 22·2 sq. m.; weight, empty, 827 kg.; useful load, 352 kg.; fuel load, 265 kg.; load carried, 617 kg.; weight, loaded, 1,444 kg.; wing loading, 65·5 kg./sq. m.; power loading, 3·44 kg./h.p.; safety factor, 11·8.

Official Performances (S.T.Aé. Tests).

Altitude (m.) ..	0	1,000	2,000	3,000	4,000	5,000	6,000
Max. speed (km.p.h.)	222	222·5	222·6	223·2	223·2	221·4	217·7
		m. s.	m. s.	m. s.	m. s.	m. s.	m. s.
Climb		2 42	5 14	7 57	10 56	15 17	21 14

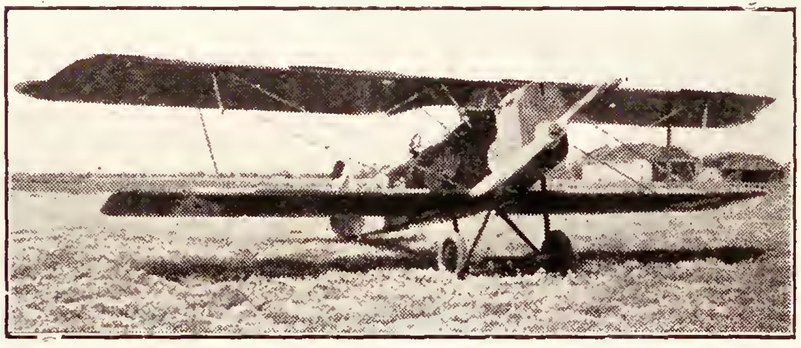
Climb to 7,000 m. in 29 min. 22 sec.; ceiling, 8,500 m.; low speed at 850 m. altitude, 104·2 km.p.h.; unstick run, 106 m.; landing run, 190 m.

The aircraft factory of Avions Michel Wibault at Billancourt (Seine) is at the present time exclusively engaged in production and development work for the French Army Air Service. They have, beside the production order for 7 C.1's, in course of construction a single-seater attack machine, type 13 C.1, with 400 h.p. Hispano-Suiza engine, and a type 12 C.2 two-seater fighter with 500 h.p. Hispano-Suiza engine. Other types recently produced include the 8 C.2 two-seater fighter (500 h.p. Hispano-Suiza), the 9 C.1 single-seater fighter (400 h.p. Hispano-Suiza), and the 10 G.R. long reconnaissance two-seater (420 h.p. Gnôme-Rhône Jupiter), all of which have passed the S.T.Aé. tests.

AERO TOVARNA LETADEL

It is regretted that, owing to the late arrival of the necessary material, it has not been found possible to include, in its proper alphabetical position in the pages dealing with the Paris Aero Show, the account of the two machines which will be exhibited by the Czechoslovak firm *Aero Tovarna Letadel,* of Prague. The data, specifications, and photographs did not arrive at our offices until the day before we went to press with this week's issue of Flight, but, in order that our readers should have as complete an account as possible of the machines to be exhibited, we have included the products of this well-known Czechoslovak firm here, at the end of the Paris Show article.

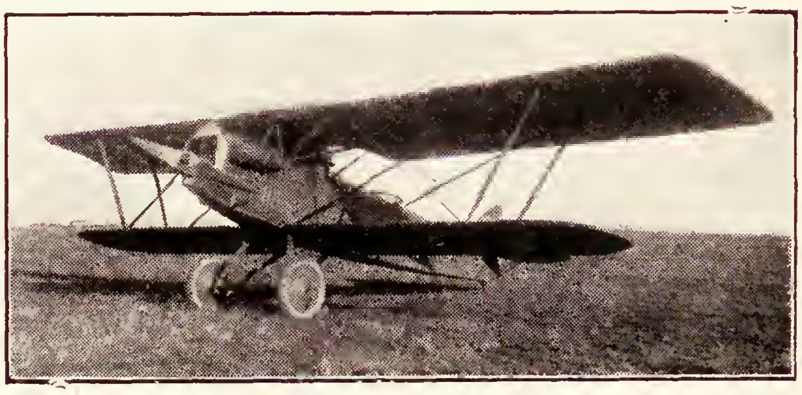
The two machines exhibited by this firm will be a type Aero A.11 two-seater reconnaissance machine, and an Aero A.30 long-distance reconnaissance biplane.



The Aero A.11 reconnaissance two-seater with 240 h.p. Perun engine.

The type *A*.11 is produced with two types of engine, the A.11, with a 240 h.p. Walter water-cooled engine, and the Aero Ab.11, which has a 240 h.p. Perun engine. The A.11 is of mixed construction in that the fuselage is a steel-tube structure, while the wings are of normal wood and metal fittings construction. The machine is fitted with dual controls, the joy-stick fitted in the observer's cockpit being detachable and carried, when not in use, in clips on the side of the cockpit. A petrol tank of 185 litres capacity is installed in the fuselage between the front cockpit and the engine, while a service tank is built into the top plane and has a capacity of 120 litres, giving a total of 305 litres, which is stated to be sufficient for 3½ hours' flying at full throttle.

The armament consists of a fixed machine gun firing through the propeller and two swivelling guns mounted on a turntable. A camera of 70 or 50 cm. focus is placed to the left of the observer, and is mounted on rubber shock absorbers. In addition, the observer's cockpit contains a wireless outfit comprising sending and receiving set. The machine is equipped with two parachutes. A 240 h.p. reconnaissance machine does not impress one as being quite powerful enough in these days, but the A.11 has a series of very excellent flights to its credit, including a number of Czechoslovak records. Following are the main data relating to the Aero A.11: span, 12·78 m.; length o.a., 8·34 m.; wing area, 36·51 sq.m; weight empty, 1,027 kg.; fuel, 189 kg.; useful load, 318 kgs.; total loaded weight, 1,534 kgs. Maximum speed at ground level, 215 km./hr. Climb to 1,000 m. in 2 mins.;



The Aero A.30 two-seater long-distance reconnaissance biplane, 450 h.p. Lorraine engine.

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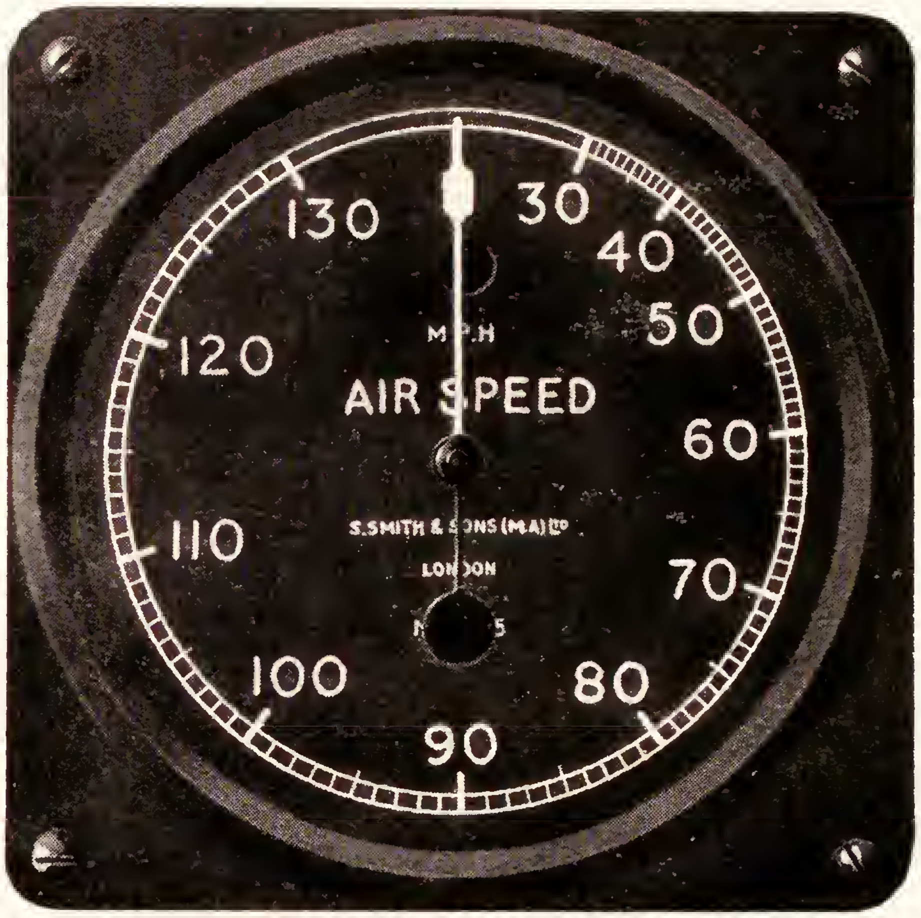

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to 2,000 m. in 5 mins. 10 secs.; to 3,000 m. in 8 mins. 30 secs.; to 4,000 m. in 12 mins. 50 secs.; to 5,000 m. in 19 mins. 20 secs. Service ceiling, 7,600 m. It will be seen that for its power the Aero A.11 has a very good performance.

The *Aero Tovarna A*.30 is a long-distance reconnaissance biplane fitted with 450 h.p. Lorraine-Dietrich engine. Other power plants of approximately the same weight and power can, however, be supplied. Particular care has been taken in the arrangement of the pilot's instrument-board in this machine, so that such instruments as have to be constantly watched are so placed as to be easily seen without the pilot having to turn his head to any great extent. The fuselage is of steel-tube construction, but welding is not employed in parts that have to resist any severe stress. The engine mounting, also of steel-tube construction, is easily detachable.

The wing construction is the usual, with spars and ribs of wood, and internal drag struts of steel tube, the drag bracing being by wire.

The armament of the A.30 is the usual, *i.e.*, a fixed Vickers gun firing through the propeller, and two Lewis guns on a rotating gun ring for the observer. A form of compensator is employed in order to relieve the air pressure on the aft guns when flying at high speed. A wireless outfit is carried in the observer's cockpit. Parachutes, fire extinguishers and oxygen apparatus are also carried.

No performance data are available.

"THE FIRST WORLD FLIGHT"

As sportsmen, we have from the first given our whole-hearted and envious admiration to the four gallant American lads who made the first circuit of the world by air; and our equally sincere sympathy to the other four who set out but did not get round. These young followers of Odysseus have been fortunate in finding a worthy Homer to tell of their wanderings, in the person of Mr. Lowell Thomas, whose delightful lectures at Covent Garden are still fresh in the memory of Londoners. For of the eight adventurers only one, Leslie Arnold, had any gift for expressing his thoughts by tongue and pen. Mr. Lowell Thomas has made of the record a delightfully vivacious book of adventure, enjoyable by all ages and both sexes.

It goes without saying that a review in FLIGHT must look first for the technical lessons of the flight as told in the book. The outstanding point of this nature is the way in which the Douglas World Cruisers stood up to the gruelling task which was set them. The Americans admitted, when they met Locatelli in Iceland, that his Dornier Wal flying-boat "appeared to be the most efficient plane for long-distance flying that we had ever seen"; but none the less, the Douglas machines did all that was asked of them. The Liberty engines sometimes let them down, but the Douglas biplanes never.

There was occasional damage in a heavy sea, but it was usually repairable on the spot. The machines were heavily loaded and slow, and at Haiphong, for example, in a dead calm on a river, it took the pilots three hours to get off the water, and even then they could not get on their steps until they had taxied 12 miles down the river, dodging the native shipping, to reach the ripples in the Gulf of Tongking. But of mechanical breakdown in the aeroplanes there was none.

The Liberty engines did not stand the strain so well. The story of the engines is briefly as follows: The first set of engines flew from Seattle to Japan, some 3,000 miles. The second set were installed at Kasumigaura. When flying between Haiphong and Lourane in French Indo-China, the engine in Lowell Smith's machine, the "Chicago" developed a leaky radiator, over-heated, and practically broke up. A con. rod came through the crankcase. Smith landed on a lagoon, and a new Liberty was brought from Saigon, and was installed. Between Allahabad and Ambala, the engine in Nelson's machine, the "New Orleans," developed a leaky cylinder. A new cylinder was obtained from the British store at Lahore and was installed. When approaching Karachi, this same engine commenced to fly to pieces in the air, from some cause which was never ascertained, and Nelson only just struggled into Karachi. At Karachi, the third set of new engines was installed. This set took them successfully to Brough, where the fourth set of Libertys was installed. Flying from the Orkneys to Iceland, the oil pump in the engine of the "Boston," Leigh Wade's machine, failed. He alighted on a very rough sea, and though the machine was found and taken in tow by the U.S. cruiser *Richmond*, it was battered to pieces by the waves and sank. At Ivigtut, in Greenland, the two survivors installed their fifth set of engines—at least, it was the fifth for the "New Orleans," and the sixth for the "Chicago." Flying from Greenland to North America, Lowell Smith in the "Chicago," found both his petrol power pump and his wind pump out of action, while an oil leak also developed. His companion, Arnold, worked the hand pump for three hours, and they made America. Ten miles beyond Baltimore, the engine of the "New Orleans" stopped dead, the timing gears having slipped, just above the only possible landing ground for miles. At San Diego, engines were changed for the last time, the "New Orleans" receiving her sixth, and the "Chicago" her seventh. If I have overlooked any other changes of engines, I offer my apologies to the manufacturers of the Liberty motor.

Of course, it was great good luck for the world-fliers that they found Liberty engines in use by the Royal Air Force in India. One rather wonders whether their legs were pulled by the R.A.F. men at Ambala, or whether pure Yankeeism is responsible for this passage, which, by the way, is put into the mouth of Erik Nelson, who is by birth a Swede:—"To our delight, we found the British aviators in India were all using our Liberty motors—two thousand of them! And they swore by them, too. This was gratifying, because European engines had long held first place in the aeronautical world. But since the War the Liberty 12 has come to the front." As a matter of sober fact there are two bombing squadrons in India equipped with the D.H.9A-Liberty, namely, Nos. 27 and 60. And if they were to keep 2,000 Libertys for those two squadrons—well, who would say that it was not a wise precaution?

Mr. Lowell Thomas has edited the story of the flight with much judgment. We do not want, and we do not get, long accounts of well-known countries, such as India and France. But lands which are almost unknown to most well-read people, such as the Aleutian Islands and Iceland, are described in considerable detail. Of course, the worst parts of the flight were the two Arctic sections; and so, for more than one reason, the author, or editor, has chiefly expended his descriptive powers upon the North Pacific and the North Atlantic. In fact, Mr. Lowell Thomas has treated his story as a "Travelogue," a story of adventure. Deliberately he emphasises the dangers which were faced and overcome and the hardships which were endured. In doing so, he has aroused the admiration of his readers for the much-enduring heroes who made the flight; at the same time he has emphasised the uselessness of the flight from the point of view of opening up commercial air routes. After reading this book it is impossible to imagine aircraft ever being put to a useful purpose in the fogs and among the mountains and icebergs of the North Pacific. Major Martin crashed there, and the other three aeroplanes were extraordinarily lucky to escape unscathed. That is the only real lesson to be drawn from the flight, and it is a negative lesson. Let the reader, therefore, take this book merely as a book of adventure. It is as thrilling as anything in "Herbert Strang's Annual," and the six—in fact the eight—heroes are paladins indeed.

F. A. de V. R.

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* The First World Flight; being the personal narratives of Lowell Smith, Erik Nelson, Leigh Wade, Leslie Arnold, Henry Ogden, John Harding, written by Lowell Thomas, author of "With Lawrence in Arabia." Hutchinson & Co., Ltd.

Reduction of R.A.F. in Iraq

Matters having settled down somewhat in Iraq, and, incidentally, owing to the inauguration of the Cairo-Karachi air service, it has been possible to reduce the R.A.F. in Iraq from eight squadrons to seven, as from November 1. No. 1 Squadron (Sq.-Comdr. Cyril Lowe) of Fighters, stationed at Hinaidi, is being disbanded in Iraq, but will be re-formed next year as one of the Home Defence Squadrons. The original personnel will remain in Iraq to fill vacancies in other units out there.

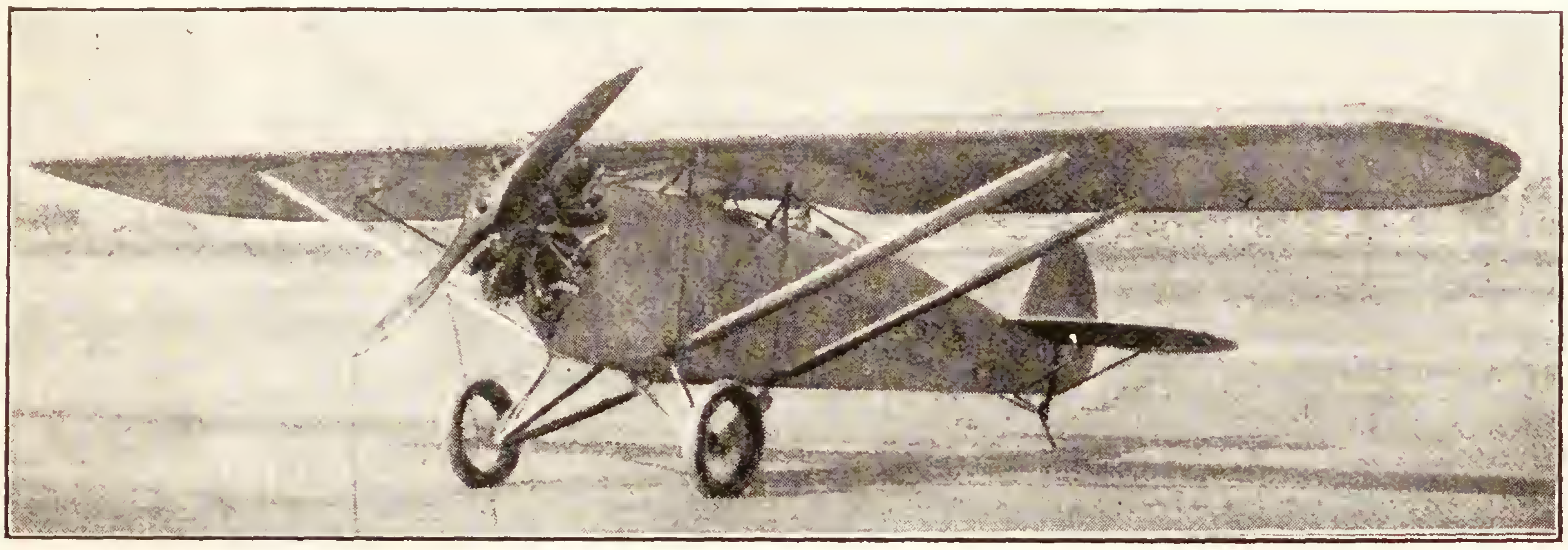
"Alan Cobham, Limited"

It is reported that a new private company with a capital of £1,000 in £1 shares has been registered under the title of "Alan Cobham Aviation, Ltd.," of which Sir Alan Cobham is a director. The business of the company will be the manufacture of aircraft.

U.S. AIR MAIL SERVICES

Offshoots of the Transcontinental Services

Note.—In our issue for June 10 we gave a list of the ten contract air mail services which have been entered into by the U.S. Post Office Department, consequent upon the decision to extend the U.S. air mail services beyond that of the original Transcontinental route, which has been in successful operation for some years. We give below brief particulars of two of these C.A.M. services, and in a subsequent issue we will refer to the remaining routes. Other articles on this subject appeared in FLIGHT for June 17, July 1, and October 21 last.



U.S. AIR MAIL SERVICES, C.A.M. No. 8 : The Ryan "M-1" monoplane, fitted with a 200 h.p. Wright "Whirlwind" engine, which forms part of the flying stock of the Pacific Air Transport, Inc., on the Seattle—Los Angeles route, part of which is flown by night.

C.A.M. No. 8.—Seattle-Los Angeles (1,100 miles)

THE Seattle-Los Angeles contract air mail route is the longest (at present) and not the least important of the contract services, the total distance from end to end being 1,100 miles. The contractors for this route are the Pacific Air Transport, Inc., the president of which is Verne C. Gorst, and the vice-president C. N. Comstock.

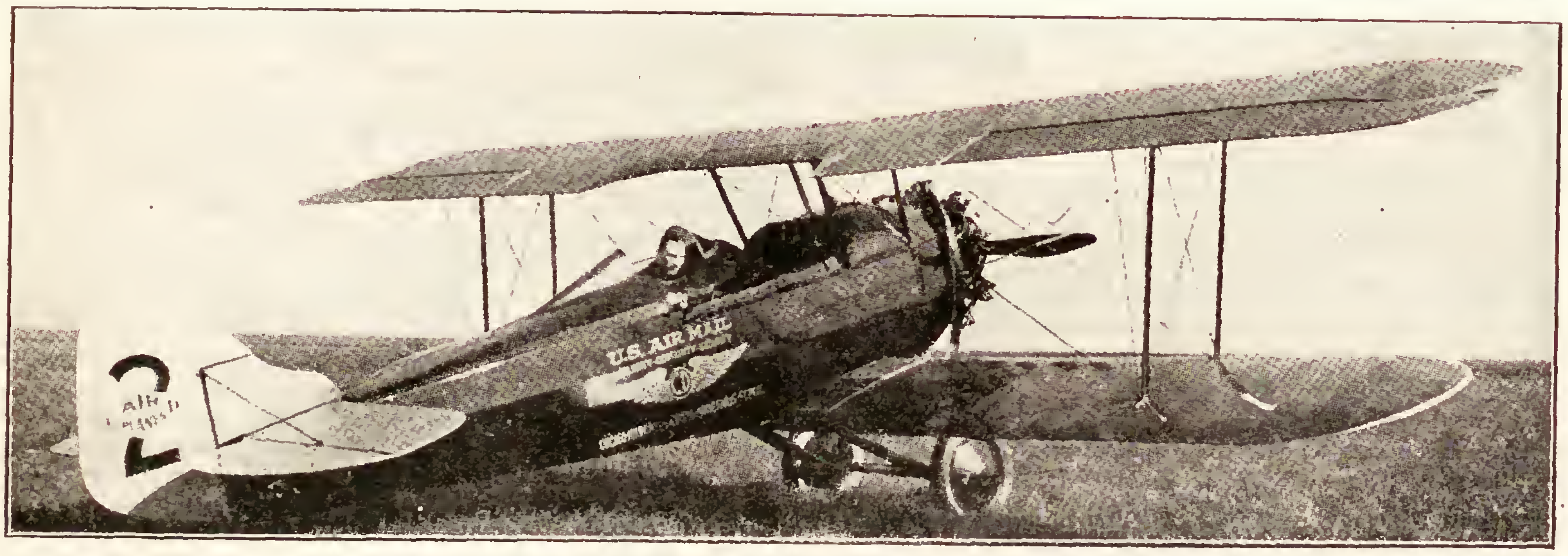
The route is an extremely important one, since it links up the following big business centres and cities situated along the Pacific coast: Seattle, Portland, Medford, Ore, Sacramento, San Francisco, Fresno, Bakersfield, and Los Angeles. It commenced operations on September 15 last, and it is of interest to note that it is the first of the contract air mail routes to be operated by night as well as day. Night flying beacons, similar to those in use on the night section of the Transcontinental route, have been installed between Seattle and Portland, and San Francisco and Los Angeles, the remainder of the route being flown in daylight.

According to the present schedule, south-bound machines leave Seattle daily (Mondays excepted) at 3.45 a.m., Portland at 5.45 a.m., Medford at 8.15 a.m., San Francisco at 12 noon, Fresno at 2 p.m., Bakersfield at 3.30 p.m., and arrive at Los Angeles at 5 p.m. The north-bound machines leave Los Angeles at 12 midnight, Bakersfield at 1.45 a.m., Fresno at 3.30 a.m., San Francisco at 5.30 a.m., Medford at 9.30 a.m., Portland at 12 noon, and arrive at Seattle at 2 p.m.

This schedule, it should be noted, has been planned primarily to benefit the cities along the Pacific coast route itself, and no attempt has been made to make special connections with the Transcontinental route to the east, as the advantage gained in so doing would be slight compared with advantages afforded by the north and south services of the C.A.M. 8 route as run at present.

As a matter of fact, the schedule as arranged affords a marked improvement over present railway mail; for example, while the mail train leaves Seattle at 4.30 p.m., Monday, arriving at San Francisco 9.10 a.m. and Los Angeles at 7.40 p.m., Thursday, the mail 'plane leaves Seattle at 3.45 a.m., Tuesday (11 hrs. 15 mins. after the train), and arrives at San Francisco at 11.45 a.m. and Los Angeles at 5 p.m. the same day!

The Pacific Air Transport Co. employs eight machines on this route, all of the same type—the Ryan M.1 monoplane. This is a new and highly successful design, manufactured by Ryan Airlines, Inc., of San Diego. It is a high-wing, "semi-cantilever" monoplane possessing several original constructional features, which, however, we cannot detail in this



U.S. AIR MAIL SERVICES, C.A.M. No. 9 : The Laird biplane, fitted with a 200 h.p. Wright "Whirlwind" engine, the type of mail 'plane employed on the Chicago-Twin Cities route by Chas. Dickinson, the original contractor for this service. It is now operated by Northwest Airways with new machines.

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Grosvenor Challenge Cup.

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Handicap. 1st.

90 m.p.h. Long
Handicap. 3rd.

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Handicap. 2nd.

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(Signed) F.W. Cotton.
The Cotton Motor Company.

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(Signed) Geo. C. Usher.

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2000 c.c. class——1st.

Isle of Man Motor Cycle T.T.
Lightweight Race.
1st——2nd——3rd.

Grand Prix (Belgium) 1st.

South African T.T. 1st.

Scottish Six Days,
Team Prize.

Brooklands.

6 World's Records, Class A.

5 World's Records, Class C.

6 World's Records, Class D.

10 World's Records, Class F.

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and
London-Australia
Flights.**

Aeroplanes

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"In Search of the Sun."

MR. T. Neville Stack and Mr. Bernard S. Leete, of the Lancashire Aero Club, started for the East, on their D.H. Moth light aeroplanes, on November 15th.

If conditions are favourable, they will endeavour to set up a long distance record for light aeroplanes.

To ensure the absolute reliability and maintenance of power output essential on duration flights, they are following the precedent now so firmly established by using throughout their journey—

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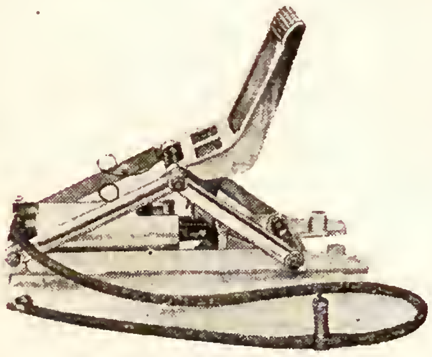

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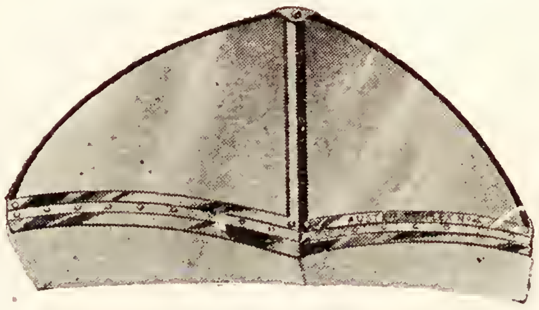

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article, as we propose to give our readers a full description of this machine in a future issue of FLIGHT.

It may be said, however, that, fitted with a 200 h.p. Wright "Whirlwind" engine, the Ryan M.1 carries a pay load of 600 lbs. at a cruising speed of 115 m.p.h. So far these machines have proved very successful on this route.

C.A.M. No. 9—Chicago-Twin Cities (400 miles)

THIS air mail route, which links Chicago with the Twin cities—St. Paul and Minneapolis—via Milwaukee and La Crosse, was originally contracted for by Chas. Dickinson, of Chicago, who commenced operations on June 7 last with a daily service in each direction, using Laird mail 'planes equipped with Curtiss OX.5 and Wright "Whirlwind" engines. On October 1, however, North-west Airways, Inc., of Detroit, took over the operation of this route, Chas. Dickinson having handed in his notice desiring to discontinue service, and this new company being awarded the fresh contract. Northwest Airways are retaining the original pilots, but are using new machines.

The original contractor stated that he was unable to make the service pay with the small quantity of mail carried over this particular route. Northwest Airways, however, are not only carrying mail alone, but passengers and freight as well, which, together with a more thorough system of organisation, should enable them to carry on with better prospect of success. The route itself should be an extremely useful one, providing as it does two very important cities of the north—St. Paul and Minneapolis—with speedy communication with other parts of the States through the connection at Chicago with the Transcontinental air route, and thence over other contract routes.

As with most other C.A.M. services, the Chicago-Twin Cities schedule is a daily one—Sundays excepted—and originally southbound mails left Minneapolis at 3 p.m., St. Paul 3.10 p.m., La Crosse 4.30 p.m., Milwaukee 6.25 p.m., and arriving at Chicago at 7.15 p.m. North-bound mails left Chicago at 5.50 a.m., Milwaukee 6.50 a.m., La Crosse 8.45 a.m., St. Paul 10.30 a.m., and arrived at Minneapolis at 10.40 a.m. We are unable to say at the moment if the present company operating this service works to the same schedule, but it is probable that modifications have been effected.

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LIGHT 'PLANE CLUB DOINGS

FATAL ACCIDENT AT STAG LANE

London Aeroplane Club

THE accident on Monday last, resulting in the death of the Ground Engineer, J. S. M. Michie, and severe injuries to S. L. F. St. Barbe, the Pilot Instructor, came as a great blow to the club.

The D.H. "Moth" G-EBNP was being tested in the ordinary way before being handed over to the members for solo flying. At the time of the flight, 1.15 p.m., very few people were on the aerodrome, and it is impossible to obtain any reliable information as to what led up to the crash. The result of the Air Ministry enquiry will, it is hoped, be issued shortly.

Michie has been the Ground Engineer since the inception of the club. He has carried out all his duties in such a manner as to win the admiration of all who came in contact with him. He had the implicit confidence of the Pilot Instructors, and all the members, and his loss to the club will be keenly felt. The injuries to St. Barbe are not quite so serious as was thought at first, and he is now making very good progress.

The London Aeroplane Club wish to extend their warmest thanks to all the light aeroplane clubs and members who sent messages of sympathy. The esteem in which Michie was held was exemplified by the large number of messages received from all parts of England.

To the parents of Michie we extend the deepest sympathy. In their great loss it must be a consolation to them to know that their son, by his unassuming manner and his devotion to his work, was beloved by all.

Flying during the past week was confined to Saturday and Sunday, and the total flying time was 10 hrs. 55 mins.

The following members had instruction: H. Spooner, Lieut.-Com. Mackintosh, D. H. P. Esler, E. J. B. King, Miss Fletcher, T. C. Sharwood, J. A. Simson, L. G. Davey, G. L. Gardner, C. E. Murrell, H. Solomon G. Eady.

The following members made solo flights: E. E. Stammers, H. Petre, C. E. Murrell, S. O. Bradshaw, O. J. Tapper, G. H. Craig, A. R. Ogston, Miss O'Brien, W. Hay, A. G. D. Alderson.

The following members had joy rides: G. F. Wilson, R. C. Presland, E. H. Saxon Mills, Miss Johnston.

Christmas Holidays.—The club will be closed down during the Christmas Holidays, from Thursday, December 23, to Thursday, December 30, 1926.

Hampshire Aeroplane Club

REPORT for week ending November 25.—Total flying time, 8 hrs.; instruction flying, 3 hrs. 25 mins.; passenger flying, 1 hr. 20 mins.; solo flying, 3 hrs. 15 mins.

The following members had instruction: Keeping, 1 hr.; Shepherd, 40 mins.; Bound, 25 mins.; Rumble, 20 mins.; Nicholson, 15 mins.; Cooper, 10 mins.; Kerry, 10 mins.; and the Hon. H. R. Grosvenor, 25 mins.

The joy riders were: Miss Fry, Miss Hoare and Mr. Lawrence.

The soloists were: Perfect, 55 mins.; Lieut. Graham, R.N., 30 mins.; Bowen, 20 mins.; Rumble, 20 mins.; Flying Officer Clarkson, 20 mins.; Flying Officer Odbert, 18 mins.; Fry, 15 mins.; Bound, 12 mins.; and Nicholson, 5 mins.

Competition is very keen between several of the soloists who are members of Avro's staff, and during the lunch hour each day there is a sprint race across to the clubhouse to stake claims for Moths. One day last week the Publicity Secretary was disqualified for using a bicycle, which was promptly confiscated. He was heard muttering something about revenge, and it is a notable coincidence that he put one Moth out of action the next day by making a "heavy" landing with consequent damage to the axle and propeller.

Lancashire Aero Club

REPORT for week ending November 27.—The wind having dropped and the rain having stopped, the weather has been perfect—if only one could have seen it. Unfortunately, however, it has been obscured by a dense fog during the greater part of the period.

Total flying time for the week, 20 hrs. 55 mins., made up as follows:—Dual with Messrs. Brown, Cantrill and Scholes:—Messrs. Stern, 1 hr. 45 mins. Twemlow, 1 hr. 10 mins.; Blagden, 1 hr.; Miss Brown, 55 mins.; Messrs. Nelson, 40 mins.; Crosthwaite, Forshaw and Fray, 30 mins. each; Keyes, Leigh and Wade, 25 mins. each; Slater and Dickinson, 35 mins. each; Moore, McNair, Meads, Gattrell, Anderson and Newton, 20 mins. each; Davidson and Harper, 15 mins. each; Michelson, 10 mins.

Solo:—Messrs. Costa, 2 hrs 5 mins.; Laeayo, 1 hr. 5 mins.; Goodfellow, 40 mins.; Williams, 20 mins.; Scholes, 20 mins.; Hardy, 20 mins.; Cantrill, 5 mins.

Joy-rides:—With Mr. Leeming: Mr. Brown, 40 mins.; Wood, 20 mins. With Mr. Scholes: Mr. Leeming, 20 mins.; Wood, 15 mins. With Sir W. S. Brancker: Mr. H. A. Brown, 15 mins. With Mr. Goodfellow: Mr. Bertram, 10 mins.; Blagden, 10 mins. Test flights: 2 hrs. 10 mins.

Lest Capt. Lamplugh should suspect for a moment that we have been flying with a visibility range of less than 500 ft., let us hasten to assure him that during misty weather a Scotch member, armed with a telescope, is placed on the aerodrome at a distance of 501 ft. from a half-crown. If this becomes lost to sight the alarm is immediately raised and all flying ceases.

We were very glad to see the Air Ministry representatives on Tuesday, when Mr. Goodfellow so overwhelmed them with statistics that both the D.C.A. and A.D.C.A. had to take the air after lunch in order to clear their minds. The only sad part of the show was that Yorkshire claimed them for the evening, so that they were unable to stay for the Club supper, which one feels they would have enjoyed. It was very well attended and completely successful, the guest of honour in the D.C.A.'s absence being the Czecho-Liberian air attaché. This gentleman's striking appearance, clad in morning coat, plus fours, dancing pumps and a white beaver fully justified the M.C.'s introductory statement to the effect that "the attaché, ladies and gentlemen, is a bit of a case."

Midland Aero Club, Ltd.

REPORT for week ending November 20.—The total flying time was 2 hrs. 31 mins. A week of very high winds and heavy rain considerably restricted flying.

Mr. J. Brinton made two solo flights, and Mr. H. Smith was given dual instruction. The Austin Whippet was flown twice by Capt. McDonough.

The first Midland Aero Club Dance is being held at the Palace Ballroom, Erdington, on Thursday, December 9, from 8 p.m. to 12 p.m. Tickets, price 5*s*. each, may be obtained from the Secretary, 22 Villa Road, Handsworth, or from Mr. S. H. Smith, "Windermere," Orchard Road, Erdington, Birmingham. (This week's report unavoidably held over).

The Newcastle-upon-Tyne Aero Club

REPORT for week ending November 21.—Another dismal report. The total amount of flying carried out during the week being 2 hrs. 15 mins.

"LX" is still under repair and "LY" was only put on service on Saturday after engine overhaul.

A little flying was put in on Saturday and Sunday morning. Unfortunately in taking off Mr. Mathews collided with the boundary fence, damaging the machine rather considerably.

Mr. R. N. Thompson flew with Mr. Wilson as passenger, Mr. W. Baxter Ellis with Mr. Turnbull, Mr. C. Thompson with Mrs. Heslop, and Mr. H. Ellis, the Club's newest "A" Pilot, flew alone for half an hour.

Reference to the remarks of the Yorkshire Club in last week's issue. We are glad to say that no lady member of this Club has as yet done anything approaching 60 hrs. instructional flying. We congratulate them on beating our ladies' record of eight hours, which is the shortest time a lady has been under instruction before actually going solo. We wish their Lady Member every success, and hope that this week's report confirms the hopes raised last week.

Report for week ending November 28.—The only flying for the week was 1 hr. 25 mins. on Sunday.

Mr. Parkinson was "launched" for 10 mins. on "LX," which has recently been under repair as regards some small details, and put up quite a good show. His flying was considerably better than that usually performed by one carrying out a first solo flight (as, of course, it ought to be), and he made an excellent landing. He was allowed, after this, to carry on instruction, the first flying he had done for four and a half weeks. The members who had instruction were Mr. Turnbull and Mr. Rasmussen, who each flew for 30 mins.

Mr. Irving flew for 15 mins. solo, but the weather was so bad that he decided not to stay up any longer, although he is very keen to complete the three hours, necessary before he carries out his tests.

Several games of Badminton and a little work on the "Camel" completed the week's work.

There was considerable activity on the engineering side, however, in addition to the repairs to "LX," as "LY" was being dismantled prior to being returned to its birthplace, Stag Lane, for repairs after the crash of last week, though the method employed was rather more gentle than the original operation of a week ago. An ironic touch is given in the receipt of an account for repairs to the damaged fence, but this is not quite such a serious item as that for the repairs to the machine will probably be, fortunately.

The Yorkshire Aeroplane Club.

REPORT for the week ending November 26.—The total flying time was 9 hrs. 15 mins., as follows:—Solo: 5 hrs. 5 mins.; dual, 4 hrs.; and a 10 minutes' test.

Sunday was quite a busy day, and with both machines now in commission, we managed to put in 7 hrs. 20 mins.

The following members flew solo:—Messrs. Dawson, Lax, Mann, Norway and Watson. Messrs. Brown, Gratwick, Little, Mann, Swift, Wilson and Captain Beaumont received dual instruction.

This has been a week of calling to account and setting our house in order. The house, of course, was nothing like in order when the Committee of Inspection arrived; we are now busily thinking of all the things we might have said, and wondering if other clubs are in the same plight.

We wish to take this opportunity of offering our deepest sympathy to the London club upon their accident.

FROM THE FOUR WINDS

R. 33 Makes Further Test

The British rigid airship R. 33 carried out some further tests at Cardington on November 23. These included trials of the new Cardington mooring mast, parachute drops with special airship parachute harness, and more aeroplane launching tests. With Major Scott in charge, the R 33 left the shed early in the morning and was walked to the mast, and rising to 500 ft., was then hauled in to the mast and secured. The test was quite successful, and the gear worked satisfactorily. The airship was then released from the mast and carried out a short cruise in the neighbourhood, during which one of the two "Grebe" aeroplanes attached to her keel was released, with Sqdn.-Leader B. E. Baker in charge, who made a successful descent. A dummy parachute drop was also made. R 33 then flew to Pulham, and on arrival there Aircraftsman Dobbs made a parachute descent with the new parachute harness and the second "Grebe" was released.

Empire Airship Masts

Canada is already acting on the recommendation of the Imperial Conference that the Dominions should give early consideration to the erection of mooring masts for Empire airships. The plans, etc., of the new mast at Cardington have been sent over to Canada, in order that consideration of the detailed cost of erection may be attended to without delay. Mr. Mackenzie King's promise regarding Canada's mast has, of course, to be ratified by the Canadian Parliament, but it is stated that it is almost certain to go through without difficulty.

Australian Pacific Flight

Group Capt. Williams, who had to abandon the flight to Samoa after having got as far as Roviana, is returning to Melbourne on the D.H.50 seaplane, and arrived at Samarai, New Guinea, on November 29.

Air Beacon on Mount Etna

Proposals have been made for the erection of a large aerial lighthouse—with one billion or more candle-power lamps—on the top of Mount Etna, at a height of over 10,000 ft. above sea level. It is intended that this beacon should serve as a guide for pilots of commercial or military aircraft flying at night across the Mediterranean. The wind which blows almost constantly over this volcano, will, it is stated, be utilised to contribute towards the power required for supplying the necessary electricity for operating the beacon. It will be remembered that a large aerial beacon has already been erected at Dijon.

U.S. Non-stop Flight Attempt

On November 23 two U.S. Naval PN10 flying-boats left Hampton Roads in an attempt to make a non-stop flight to Colon, Panama (2,060 miles). PN10 No. 1, however, was forced down in the Caribbean Sea with a broken connecting rod, and the pilot, Lieut. Connell and his three companions, were "rescued" by a U.S. cruiser some ten hours later. The other machine came down off the Isle of Pines with lubrication trouble, but resumed the flight on November 26, and arrived safely at Colon that evening.

Sir Alan Cobham in America

Sir Alan Cobham and Lady Cobham arrived in New York on November 25, but unfortunately rough weather prevented him flying from the *Homeric* in the "Moth" seaplane, as originally planned. However, accompanied by Lady Cobham and a mechanic, he taxied towards shore, and was later taken in tow to Battery Point.

An Australian Night Flight

A 400-mile night flight was accomplished in Australia on November 27 by Sq.-Ldrs. Hepburn and Wrigley, R.A.A.F. They left Richmond, N.S.W., at 8.20 p.m. for Pointcook Aerodrome (Melbourne), but had to land, owing to a leaking petrol tank, at Violet Town (70 miles from Melbourne) at 3.30 a.m.

The "Moths'" Eastern Tour

The two D.H. "Moths" piloted by Capt. T. N. Stack and Mr. B. S. Leete, are making slow but sure progress eastward. Both pilots reached Marseilles on November 24, and left again for Pisa on the following morning. No doubt as soon as they strike a more reasonable climate they will make up for lost time.

Swiss African Flight

Lieut. Mittelholzer, the Swiss pilot, started on the Dornier seaplane from Zurich on November 28 *en route* for Africa in connection with the scientific research expedition referred to in Flight recenrly. On arriving over the Alps, however, a severe snowstorm compelled him to return to Zurich, and await more favourable weather conditions.

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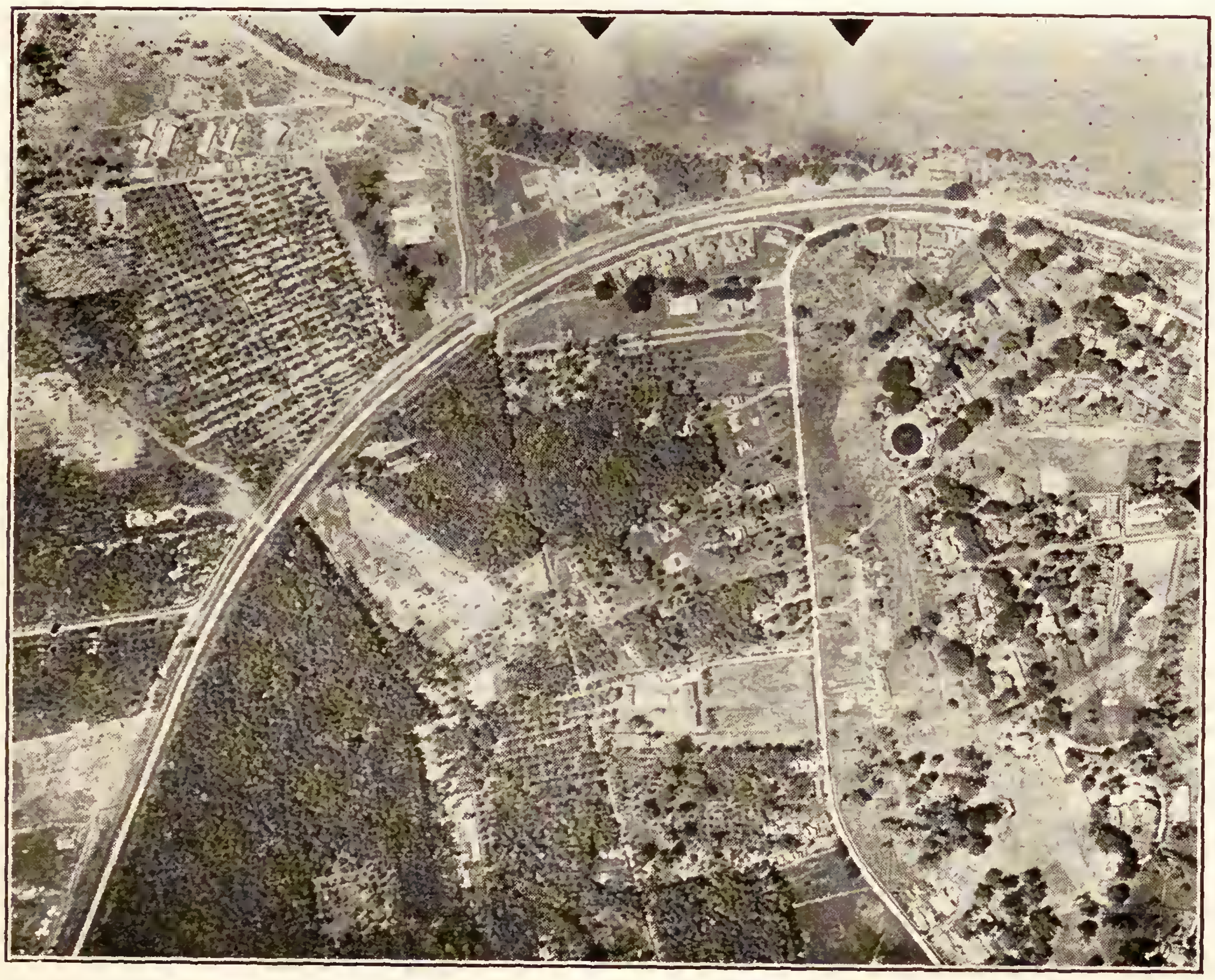
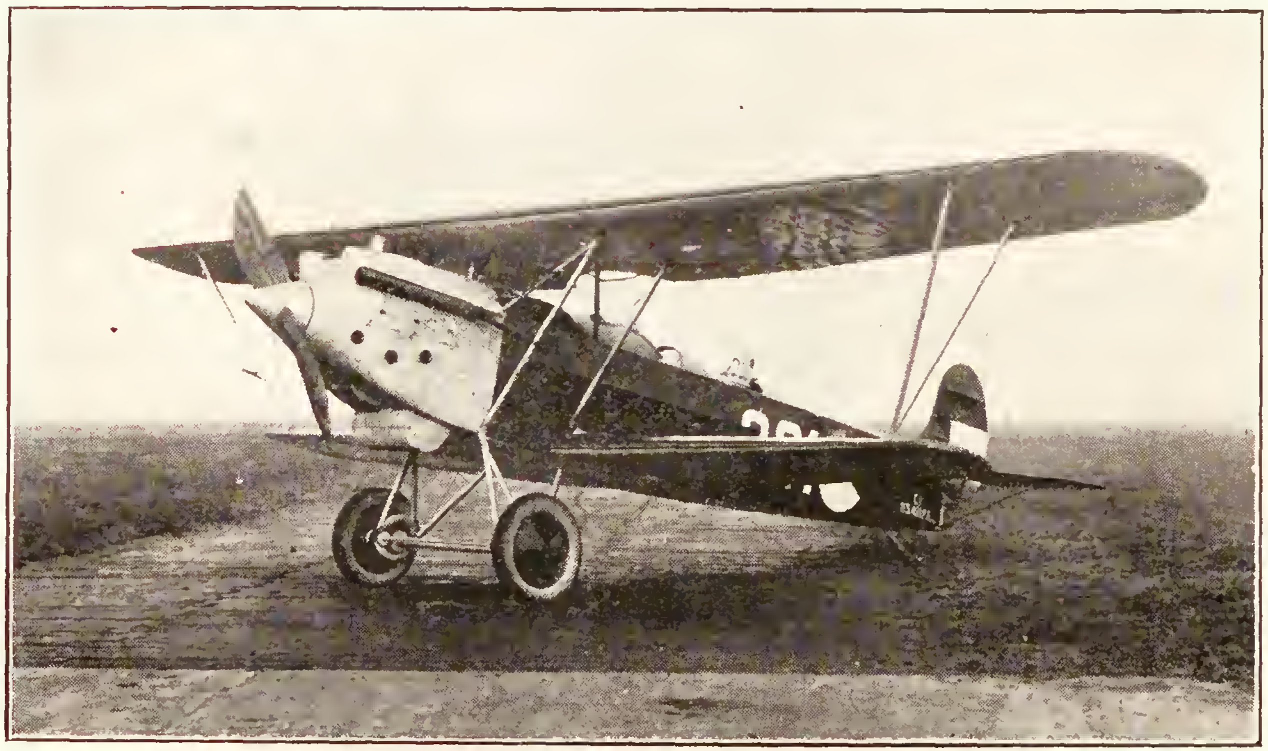


Air Surveying in the East: This photograph, taken by representatives of the Air Survey Co., Ltd., shows, at the top of the picture, a river bank. The regular patch in the top left-hand corner shows a coconut plantation, and below this, on both sides of the railway, are rubber plantations and smaller groups of coconuts. On the right are seen roads, bungalows, and a small water reservoir.

FOKKER AEROPLANES.



Fokker C.V-D., Hispano-Suiza 520 h.p., as a two-seater fighter.

FOKKER C.V.

THE UNIVERSAL MILITARY SERVICE 'PLANE.

The Fokker C.V. two-seater is the most economical military service aeroplane in the world. Its standardised detachable engine-bed enables the installation of any engine ranging from 250 to 650 h.p. By simply changing the wings and/or the power unit, the C.V. can be used for all military purposes, such as

Two-seater Fighter,
Artillery Spotter,
Reconnaissance Machine,
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EXCELLENT PERFORMANCES.

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Fokker Commercial Aeroplanes are famous for their
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Robustness of Construction,
Efficiency,
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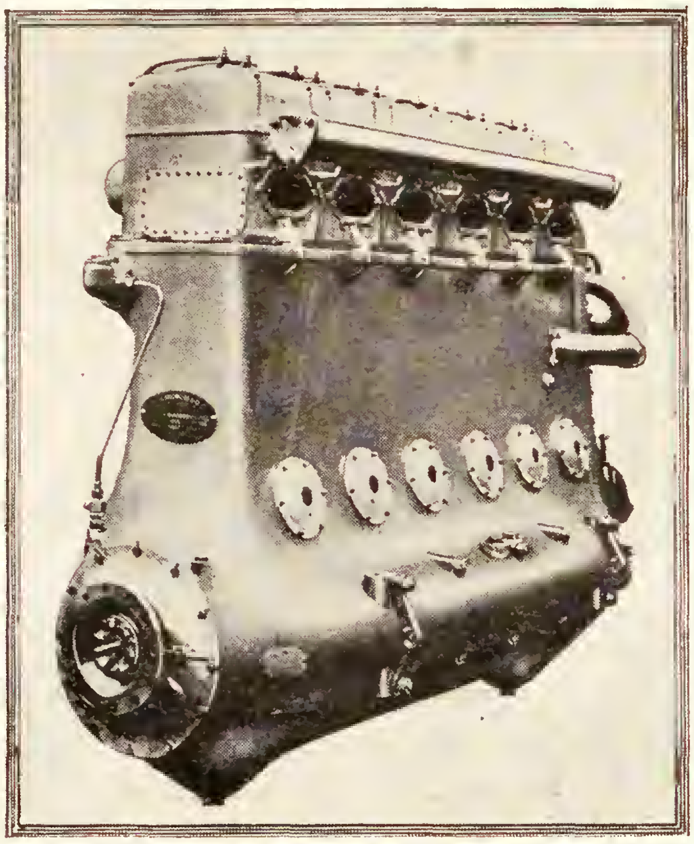
B.H.P.
Low Fuel Consumption,
·48 lbs. per B.H.P. hour.

The Beardmore "Cyclone" Aero Engine marks a distinct forward step in design. The combination of direct drive and low head resistance and slow moving propeller makes for great aerodynamic efficiency. Simplicity in design ensures low maintenance costs.



1,350 R.P.M.
Low Oil Consumption,
·01 lbs. per B.H.P. hour.

Particulars of the "Cyclone" and other Beardmore Aero Engines gladly discussed with responsible executives.

Enquiries can be directed for convenience to Aero Engine Dept., William Beardmore & Co., Ltd., 36, Victoria Street, London, S.W.1.

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EAST COWES, ISLE OF WIGHT.

BUSH HOUSE, ALDWYCH, LONDON, W.C.

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OUR Marine Craft hold the World's Record for speed and durability, this year beating CANADIAN, FRENCH, AMERICAN and GERMAN boats.

Why not make use of our 96 years' experience of designing and constructing all types of light craft.

TAYLOR GOLD MEDALLIST DINED

On November 19 the Institution of Aeronautical Engineers held a dinner at Kettner's Restaurant in honour of Capt. W. H. Sayers for the purpose of presenting him with the Taylor Gold Medal for the best paper read during the session 1925–26. This medal is being presented each year by Capt. G. A. Taylor, F.R.A.S., F.R.G.S., M.I.Ae.E., a member of the Australasian branch of the Institution, and is to be awarded at the discretion of the council to the member who submits or reads the most valuable paper during the session. The first award of the medal has been made to Capt. Sayers for his paper on "The Modern Theory of Aerofoils and its Application to Aeroplane Design," read on June 8, 1926. This paper has just been published in Minutes of Proceedings No. 20 of the Institution.

At the dinner, Mr. R. J. Parrott was in the chair and made the presentation, ably supported by Dr. Thurston, Mr. Hulbert, and Capt. Lamplugh. In making the presentation, Mr. Parrott said that the best thanks of the Institution were due to Capt. Taylor for his generosity in giving this gold medal, which would serve as a common bond between the Institution at home and the branch in Australia. Concerning the paper for which the first award had been made, he felt sure this would prove a valuable addition to what had already been written on the subject.

Capt. Sayers, in responding, said he was very sensible of the great honour that had been conferred upon him. He felt that it should really have been he who should have given a dinner to the Institution, since in compiling the paper he had used the Institution for his own purposes. He hoped that when members had had time to study the paper they would feel that the award was justified.

Dr. Thurston, in proposing the toast of "The Institution of Aeronautical Engineers," recalled that the Institution was "a Society for the encouragement, development, and protection of the profession of aeronautical engineering," and drew attention to the great heritage into which the aeronautical engineer had come. He paid a tribute to the early pioneers of flying, notably to Mr. A. V. Roe, head of that great and honoured company which was represented that evening by Mr. Parrott. Dr. Thurston concluded by paying a warm tribute to Mr. Hulbert for his valuable work as acting Honorary Secretary, to which Mr. Hulbert replied that it was more nerve-racking to have to reply to Dr. Thurston's eulogies than to go with a man on his first solo flight. Referring to the Institution, Mr. Hulbert said it wanted many more members. He did not advocate indiscriminate canvassing, but he hoped all those present would lose no opportunity of bringing home to their friends the advantages of joining the Institution.

Capt. Lamplugh, in proposing the toast of the Chairman, said Mr. Parrott was one of the ruling spirits of probably the most famous aircraft works of all. Concerning Capt. Sayers and the award of the Taylor Gold Medal, he felt that the paper was worth not only this, but a Schneider Cup complete.

The more serious part of the evening having thus concluded, the guests gave a demonstration of the qualities of their under-carriages to the tune of the Kettner Dance Band.

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A REALLY USEFUL MICROMETER

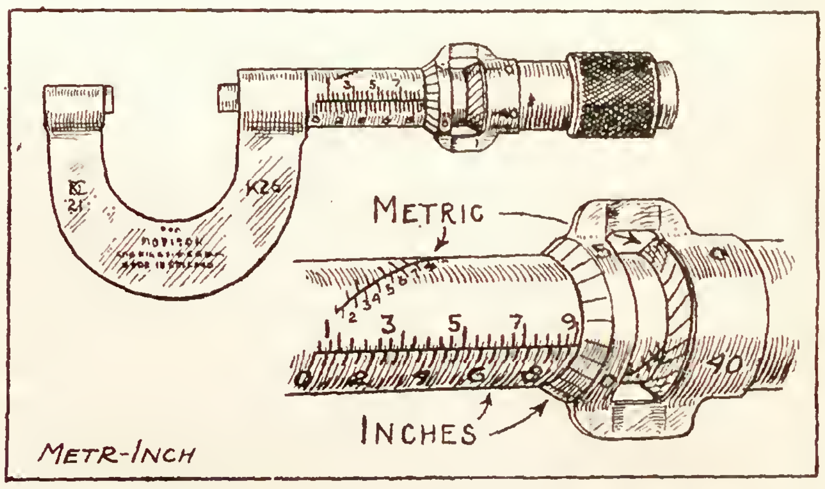
We recently had the opportunity of inspecting a micrometer designed on entirely original lines which should, we think, fill a long-felt want in all branches of engineering where work is done both in English and metric measurements. It frequently happens that a job entails the reading of measurements in inches for one part, while in another these are in millimetres. Hitherto, the worker has had to possess two separate micrometers, one reading in inches and the other in millimetres, or else has referred to tables of equivalents, or resorted to lengthy calculations—all of which are bothersome methods, where errors and confusion frequently creep in.

With the micrometer referred to above all these troubles are banished in a simple, effective and ingenious manner, for this micrometer gives at a glance a dual reading, both in inches and in millimetres. It must be mentioned at the outset that this direct reading of micrometer indications to English and metric standards of measurements on the same instruments, is *not* accomplished by combining the two scales—English-metric—on the same datum or reading line, as this is obviously a most unsatisfactory procedure, not only as regards producing such a scale with accuracy, but in reading it also.

The Madison-St. Gervais "Metr-Inch" micrometer accomplishes the dual reading in a very ingenious and accurate method, as follows (see also accompanying sketch). In addition to the ordinary calibrated datum line scribed horizontally on the micrometer sleeve, there is another calibrated helical line scribed round the sleeve above it. The former is the inch scale and the latter is the metric scale. Two calibrated rings are provided on the revolving thimble, the front one of which is divided in radial lines so as to coincide with the horizontal or inch scale, whilst the other is divided in tangential lines, to coincide with the helical or metric scale.

In this way it is impossible for there to be any confusion between the two readings, which, furthermore, are easily read. A locking arrangement is, of course, also provided.

Although a French invention, this micrometer is British made, the workmanship and finish being of the best. It has, we understand, been favourably commented upon by the War Office, Admiralty, Air Ministry, and Dockyards. One of these micrometers was tested by the National Physical Laboratory, Teddington, and by them was passed as Grade 1, the report on the test stating that, calibrated for progressive error at 0·1-in. intervals over the 1-in. run of scale, the errors at 62° F. were found to be within 0·0001 in. and 0·003 mm. on the two scales. The periodic error was investigated over complete revolutions at three positions along the screws, and in each case the errors found were within 0·00005 in. and 0·002 mm. When the faces of the micrometer are in contact the zeros of the two scales are correct to 0·0001 in. and 0·002 mm. respectively.



A COMBINATION INCH-METRIC MICROMETER: The above sketch shows a useful micrometer, the Madison-St. Gervais "Metr-Inch," which gives simultaneous readings in both English and metric measurements. The enlarged view shows the arrangement of the dual scales—0 to 1 in.

This micrometer should, therefore, form a valuable part of the equipment of every aircraft or engine factory, not only on the score of saving time, but money, for we understand that the price of this micrometer is only slightly more than the average price of an ordinary micrometer.

Further particulars regarding the "Metr-Inch" micrometer may be obtained from Messrs. Madison-St. Gervais, 26-27, St. Stephen's House, Westminster, S.W.1.

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A Kiel-Thames Air Service?

According to our contemporary *Airways*, Kiel Canal and the Thames may shortly be linked by a regular air service. It is stated that plans have already been prepared by the German authorities for a flying-boat service between the Kiel Canal and the mouth of the River Thames. This line, which is scheduled to start next spring, will be operated by twin-engined 1,400 h.p. Dornier flying-boats, providing accommodation for twenty-one passengers in two separate cabins.

NOTICE TO AIRMEN

Procedure for Obtaining Single Bearings By D.F. W/T

As a trial measure, the procedure described in paragraph 35A of the Air Pilot Appendix, Part II, page 12A, hitherto applied only to aircraft of Imperial Airways, Ltd., will henceforth be available for all aircraft flying in the vicinity of the London-Continental route. The following procedure is therefore temporarily substituted for that outlined in paragraphs 35 and 35A, Air Pilot Appendix, Part II :—

The procedure, when using R/T, for an aircraft desiring to obtain a *single* bearing from Croydon, Pulham or Lympne, is as follows :—

Two types of bearings are given according to the form of the request—

A. The true bearing of the aircraft from the D.F. station.

B. The magnetic bearing of the D.F. station from the aircraft.

Examples

A. Aircraft F-FHMU wishes to obtain its *true* bearing from Lympne—

1st Action

Aircraft F-FHMU calls Lympne and asks for its bearing :—

"Hullo Lympne, Air Union F-FHMU calling, aircraft true bearing required, aircraft true bearing required, over."

2nd Action

Unless Lympne has already obtained a satisfactory bearing, that station replies :—

"Hullo Air Union F-FHMU, Lympne answering, Righto, Righto, speak for half minute, speak for half minute, over."

3rd Action

The aircraft then speaks for half a minute, remembering that Lympne is paying no attention to the actual words and might not, therefore, hear if anything of importance was passed.

4th Action

Lympne replies :—

"Hullo Air Union MU, Lympne answering, aircraft true 110 at 1509, aircraft true 110 at 1509, over."

5th Action

The aircraft replies :—

"Hullo Lympne, Air Union MU answering, understand aircraft true 110 at 1509, understand aircraft true 110 at 1509, over."

6th Action

Lympne replies :—

"Hullo Air Union F-FHMU, Lympne answering, that is correct, that is correct, switching off."

B. Aircraft F-FHMU desires to obtain Croydon's *magnetic* bearing from the aircraft.

Note.—After applying deviation and allowing for drift this bearing gives the course to fly to reach Croydon. The word "course" should not be used in asking for this type of bearing.

1st Action

Aircraft F-FHMU calls Croydon, and asks for Croydon's magnetic bearing :—

"Hullo Croydon, Air Union F-FHMU calling, Croydon magnetic bearing required, Croydon magnetic bearing required, over."

2nd Action

As in "A" with the substitution of "Croydon" for "Lympne."

3rd Action.

As in "A" with the substitution of "Croydon" for "Lympne."

4th Action

Croydon replies :—

"Hullo Air Union MU, Croydon answering, Croydon magnetic 295 at 1413, Croydon magnetic 295 at 1413, over."

5th Action

The aircraft replies :—

"Hullo Croydon, Air Union MU answering, understand Croydon magnetic 295 at 1413, understand Croydon magnetic 295 at 1413, over."

6th Action

As in "A" with the substitution of "Croydon" for "Lympne."

(*No.* **76** *of* 1926).

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ROYAL AERONAUTICAL SOCIETY

(*Official Notices.*)

Lecture.—The fifth lecture of the first half of the Sixty-Second Session will be held today, December 2, at 6.30 p.m., at the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, when Mr. P. B. Henshaw will read a paper on "Valve Steels." Colonel the Master of Sempill, A.F.C., Associate Fellow, will preside.

The composition and behaviour of Valve Steels is one of great importance in view of the higher engine efficiencies which are being demanded. Mr. Henshaw deals in his paper with the various properties of Valve Steels at present in general use and suggests the lines along which advances are possible.

Many important tables and curves of test results recently carried out are given in the paper, and in particular the properties of nickel chrome steels are dealt with in detail. It is pointed out that nickel chrome steel possesses advantages which are worthy of close consideration.

Students' Section.—The Inaugural Meeting of the 1926-27 session was well attended by an enthusiastic audience. Mr. F. Handley Page, C.B.E., Fellow, gave an address on "The Future of Aviation." Lieut.-Colonel I. A. E. Edwards, C.M.G., took the chair, and presented to Flying Officer R. Linton Ragg, R.A.F., the Pilcher Memorial Prize, and the cash prize given by Lieut. R. V. de Aboim, B.N., which the Council had unanimously awarded to his paper "Experimental Flying from the Pilot's Point of View."

The following programme has been arranged :—

Saturday, December 4, 10.0 a.m. Visit to Messrs. D. Napier & Son, Ltd., Acton. (Number visiting limited to 10).

Thursday, December 9, at 7.0 p.m. in the Library. Students' Section Lecture and Discussion on "The Possibilities of the Two-Stroke Cycle for Aircraft Engines," by Mr. C. G. L. Hutchinson. Wing Commander T. R. Cave-Browne-Cave, C.B.E., Fellow, in the Chair.

Saturday, December 18, 10.0 a.m. Visit to the Hawker Engineering Co., Ltd.

*R.*38 *Memorial Prize.*—Members and others are reminded that the closing date for the receipt of names of entrants for the R.38 Memorial Prize, 1927, is December 31. The prize is offered annually for the best paper received by the Society on some subject of a technical nature in the science of aeronautics. Other things being equal, preference will be given to papers which relate to airships. The prize is open to international competition and is of the value of twenty-five guineas. A copy of the Regulations can be obtained from the Secretary.

J. Laurence Pritchard,
Hon. Secretary.

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Royal Aero Club Monthly House Dinner

The next monthly house dinner of the Royal Aero Club will be held at the Club on Wednesday, December 8, at 7.15 p.m., when a discussion will be opened by Mr. C. R. Fairey. The chair will be taken by Lord Thomson.

The Royal Air Force Memorial Fund

The usual meeting of the Grants Sub-Committee of the fund was held at Iddesleigh House on November 18. Lieut.-Comdr. H. E. Perrin was in the chair, and the other members of the Committee present were : Mrs. L. M. K. Pratt-Barlow, O.B.E. ; Mr. W. S. Field ; Sqdn.-Ldr. Douglas Iron, O.B.E. The Committee considered in all 16 cases, and made grants to the amount of £204. The next meeting was fixed for December 2, at 2.30 p.m.

THE ROYAL AIR FORCE

London Gazette, November 23, 1926.

General Duties Branch

The follg. Pilot Offrs. are promoted to rank of Flying Officer :—J. W. M. Nancarrow (Oct. 14) ; J. H. C. Purvis (Oct. 17) ; H. A. M. Weir (Oct. 31). Flying Offr. G. C. A. Armstrong is secd. for serv. as A.D.C. to the Governor of South Australia (Nov. 13). Flying Offr. S. A. Lane is transferred to Reserve, Class A (Nov. 22). The follg. Flying Offrs. relinquish their temp. commns, on return to Army duty :—H. A. Crommelin (Lt., Duke of Wellington's R), (Nov. 6) ; E. V. H. Hudson (Lt., Middx. R.) (Nov. 20).

Stores Branch

Flying Offr. on probation P. Alderson is confirmed in rank (Nov. 8) ; Flight Lt. A. Latimer is dismissed the service by sentence of General Court-martial (Nov. 8).

Accountant Branch

Flight-Lt. S. G. Linssen is placed on the retd. list on acct. of ill-health (Nov. 24).

Medical Branch

Flight-Lt. P. A. Hall, M.B., is promoted to rank of Squadron Leader (Nov. 26) ; Flying Offr. J. Parry-Evans is promoted to rank of Flight-Lt. (Nov. 19) ; temp. Capt. J. R. Williams, General List (Army), Dental Surgn., is granted a temp. commn. as Flight-Lt. (Nov. 2). He will continue to receive emoluments from Army sources. Flight-Lt. J. S. Smith (Capt., Army Dental Corps) relinquishes his temp. commn. on return to Army duty (Nov. 1).

Reserve of Air Force Officers

Flying Offr. C. J. Clark ceases to be emplyd. with the Reg. Air Force (Nov. 21). The follg. are transfd. from Class A to Class C :—Flight-Lt. W. N. Cumming (Sept. 5) ; Flying Offr. C. Duttson (June 19). Flying Offr. W. J. Hutchinson, M.B., is transfd. from Class D2 to Class D1 (Nov. 12).

The follg. Offrs. relinquish their commns. on completion of service :—Flying Offr. K. W. Brewster, M.C. (Aug. 28) ; Flight-Lt. A. Roberts, Flying Offr. S. L. Cannon, Flying Offr. P. A. Cockcram, M.C., Flying Offr. A. V. Gash, Flying Offr. B. J. Paget, Flying Offr. W. P. Woodcock (Oct. 24) ; Flying Offr. M. H. McErlean, Flying Offr. H. Wisnekowitz, M.C. (Nov. 8) ; Sqdrn. Leader T. S. Impey (Nov. 11) ; Flying Offr. E. G. King (Nov. 22).

AUXILIARY AIR FORCE

General Duties Branch

No. 600 City of Lond. (Bombing) Sqdrn.—Sqdrn. Leader (Hon. Wing Comdr.) A. W. H. James, M.C., resigns his commn. (Nov. 19).

To be Sqdrn. Leader.—Captain the Right Hon. F. E. Guest, P.C., C.B.E. D.S.O., M.P., to comd. the sqdrn. (Nov. 19).

The follg. to be Pilot Offrs. :—No. 601 County of Lond (Bombing) Sqdrn.—R. I. Forbes-Leith (Aug. 17). No. 600 City of Lond. (Bombing) Sqdrn.—J. C. Larking (Nov. 23). No. 605 County of Warwick (Bombing). Sqdrn.—C. L. Knox, V.C. (Nov. 23).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Air Commodore : E. L. Gerrard, C.M.G., D.S.O., to R.A.F. Depot, Uxbridge pending posting on transfer to Home Estabt., 25.10.26.

Group Captains : U. J. D. Bourke, C.M.G., to H.Q., Wessex Bombing Area, Andover, for Air Staff duties, 22.11.26. Hon. J. D. Boyle, C.B.E., D.S.O., to Station H.Q., Worthy Down, to Command, 1.12.26.

Wing Commanders : J. H. Herring, D.S.O., M.C., to No. 2 Flying Training Sch., Digby, pending taking over command, 1.12.26. W. G. P. Young, O.B.E., to Air Ministry (Directorate of Equipment), for duty as R.A.F. Representative on Board of Management, Navy, Army and Air Force Institutes, 22.11.26.

Squadron-Leaders : A. Lees to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 21.11.26. B. F. Moore to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26. R. P. Willock to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 4.11.26.

Flight-Lieutenants : C. E. W. Foster to No. 406 Flight, Donibristle, on transfer to Home Estabt., 6.10.26. E. H. Bryant to R.A.F. Training Base, Leuchars, on transfer to Home Estabt., 16.10.26. E. S. Moulton-Barrett to, R.A.F. Training Base, Leuchars, on transfer to Home Estabt., 13.10.26. M. L. Taylor, A.F.C., H. M. K. Brown, W. A. K. Dalzell, G. E. Wilson, H. W. Baggs, J. H. Winch, J. D. S. Denholm, F. G. Gibbons, D.F.C., and H. Norrington to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 4.11.26. J. McG. Fairweather, D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26.

Flying Officers : (Hon. Flight-Lieut.) K. M. Murray to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 28.8.26. J. H. Caulfield to No. 1 Flying Training Sch., Netheravon, 1.12.26. A. E. B. Bateman to R.A.F. Station, Donibristle, on transfer to Home Estabt., 6.10.26. T. J. E. Thornton and G. P. Mee to R.A.F. Depot, Uxbridge (Non-effective Pool), on transfer to Home Estabt., 17.10.26. A. E. Rogenhagen, L. Butler, C. H. A. Farnan and F. B. Young to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26. R. H. Giles to No. 503 Sqdn., Waddington, on transfer to Home Estabt., 17.10.26. H. S. Dawe to No. 1 Sch. of Tech. Training (Apprentices), Halton, on transfer to Home Estabt., 17.10.26. H. C. Gammon, R. Tuck, J. M. Wyer, M.B.E., D.S.M., H. D. Wardle, R. R. Greenlaw, M.B.E., and E. E. Arnold, D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 4.11.26. E. A. Hodgson and E. V. S. Lacey to R.A.F. Depot, Uxbridge (Non-effective Pool), on transfer to Home Estabt., 4.11.26.

Stores Branch

Squadron-Leaders : P. Adams, O.B.E., and F. Grave, M.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26.

Flight-Lieutenants : F. J. W. Humphreys to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26. F. J. B. Powell, M.B.E., to Station H.Q. Bircham Newton, on transfer to Home Estabt., 4.11.26.

Flying Officers : R. W. Stevenson and D. W. Dean to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 4.11.26.

NAVAL APPOINTMENTS

The following appointments were made by the Admiralty on November 27:—

Comdr. R. Ramsbotham, lent to Air Ministry, 18.12.26 ; and for duty with Directorate of Instruments, 24.12.26.

Lieutenants (Flying Officers, R.A.F.) : P. D. Oliver (E.), to *Hermes* and for full flying duties in 440 flight ; J. N. Sparks and C. N. Lentaigne, to *Hermes* and for full flying duties in 440 flight, previous orders cancelled ; A. N. Gray and S. T. Morgan, to *Eagle* and for full flying duties in 423 flight, 18.9.26.

Royal Air Force

Flight-Lieut. E. Brewerton, to *Hermes* for full flying duties in 440 flight, 18.9.26.

Flying Officers : G. E. Nicholettes, to *Hermes* and for full flying duties in 440 flight ; and C. F. Brewerton, to *Eagle* and for full flying duties in 423 flight, 18.9.26.

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IN PARLIAMENT

Southampton-Cherbourg Airway

Colonel Day, on November 24, asked the Secretary of State for War what steps had been taken with the French authorities with a view to the extension of the airway between Southampton and the Channel Islands to Cherbourg ?

Sir Samuel Hoare : The question of extending the British regular air service between Southampton and Guernsey to Cherbourg is primarily a matter for consideration by Imperial Airways, Ltd. Occasional flights are, however, undertaken to Cherbourg, and the question whether the special prior permission now required for each such flight, Cherbourg being within a "prohibited area," could not be dispensed with, is at present under discussion with the French authorities.

Colonel Day : Is it not the fact that it would save a day in coming from America to England, or *vice versa*, if this service were established ?

Sir S. Hoare : It would certainly save a considerable time in the transport of American mails, but exactly how long I could not say without notice.

Airship R.33

Mr. Wells asked if it was proposed to dismantle the airship R.33 ; and, if so, what steps will be taken to train crews for the airships under construction?

Sir S. Hoare : The answer to the first part of the question is that there is no present intention of dismantling R.33, and the second part does not, therefore, arise.

Mr. Wells : Did the recent trials of this vessel show her to be airworthy or not ?

Sir S. Hoare : The recent trials were not made with the object of proving the R33 to be airworthy, but with the object of making certain other tests. The trials have been successful in so far as those tests are concerned.

Light Aeroplane Clubs Subsidy

Lord Apsley asked the direct result of the subsidisation of light aeroplane clubs ; and whether there were any statistics showing the present numbers of amateur flyers and amateur-owned planes ?

Sir S. Hoare : As regards the first part of the question, there are now six subsidised light aeroplane clubs in existence, with a total of 962 members and associates ; of these, a large number are under training as pilots, and 44 have already trained and qualified on club aircraft. A number of these pilots have already joined the Air Force Reserve or the Auxiliary Air Force. As regards the last part of the question, there were, on November 1, 117 private pilots' licences held by persons other than serving Royal Air Force officers, and 33 privately-owned aeroplanes were on the register.

Hyde Park as an Aerodrome

Lord Apsley asked the Secretary of State for Air if he would consider the creation of a small aerodrome in Hyde Park for the benefit of light aeroplane taxi companies or clubs, having regard to the impetus such a measure would give to flying owing to the convenience it would afford to business men, officials, and others to whom quick access to the centre of the Metropolis is all important ?

Sir S. Hoare : My noble friend's suggestion has already been considered by the Air Ministry, but under present conditions of flying Hyde Park is not considered suitable for the purpose suggested, owing to the proximity of high buildings and trees and its densely populated surroundings.

Airship R.100 Payments

Mr. Viant asked to what company, and for what airship, was the sum of £60,000 paid during 1925 and the £30,000 in this year's Estimate ?

Sir S. Hoare : I assume the hon. member is referring to the amounts of £60,000 and £30,000 appearing for "Purchase of Airships" at page 30 of the Air Estimates, 1926. Both were taken for payments to the Airship Guarantee Co., Ltd., for the purchase of the R 100. The former sum, though estimated for, was not earned and no payment was actually made in 1925. As regards the latter sum, it is expected that an instalment of £30,000 will mature for payment under the contract before the end of the present financial year.

Royal Air Force Accidents

Mr. Robinson, on November 25, asked the Secretary of State for Air the number of non-commissioned officers and men who have lost their lives in accidents to aircraft since January 1, 1926 ; and whether he is satisfied that due precautions are taken before airplanes and pilots are allowed to ascend ?

Sir S. Hoare : The answer to the first part of the question is 28. In addition three naval or marine ratings lost their lives in Royal Air Force accidents, and one airman was killed by being struck by an aeroplane whilst he was working on the ground. As regards the second part, I am satisfied that every precaution is taken. A complete system of inspection of aircraft is in force. All pilots pass a series of thorough tests before they are allowed to fly solo, and again before they are allowed to carry a passenger. Their flying is also continually watched and supervised by their senior officers. For futher information in regard to the measures taken to prevent accidents I would refer to the reply which I gave to Colonel Gretton on November 22.

AIR POST STAMPS

By DOUGLAS B. ARMSTRONG

(*Editor of " The Stamp Collector "*)

Madrid-Manila Flight Trophies

SOME interesting relics have been added to the air post collection as a result of the sensational flight from Madrid to Manila by the Spanish airmen Gallarza and Loriza in May last. Besides official messages of greeting addressed to the Kings and Queens of Spain and England and to the Prince of Wales, letters were picked up by the aviators at various points *en route* as follows :—16 from Madrid, 44 from Calcutta, 15 from Bangkok, 59 from Macao, 2,514 from Aparri (P.I.), and 81 from Pamanga (P.I.). These were handed over to the postal authorities on arrival at Manila on May 13, 1926, when specially prepared postmarks were applied to the covers, one showing an aeroplane in conjunction with the Arms of Spain, U.S.A. and the Philippines, and inscribed " RAID MADRID—MANILA " beneath ; and another (also in the form of an aeroplane) lettered on the 'planes " MADRID TO MANILA FLIGHT " accomplished by Spanish Aviators—MANILA-Philippines Islands, May 13, 1926."

In addition, authority was given for a supply of contemporary postage stamps to be overprinted in honour of the occasion with the device of an aeroplane radiator and propeller surrounded by the words " Air Mail—1926 : Madrid–Manila." These stamps were affixed to the mail brought by the Spanish aviators prior to delivery, and were also sold as souvenirs in mint condition. According to an official declaration, the total numbers thus overprinted of each denomination were :—

2	cents,	green	10,000
4	,,	red	9,000
6	,,	violet	5,000
8	,,	brown	5,000
10	,,	blue	5,000
12	,,	orange	4,000
16	,,	olive	4,000
20	,,	orange	4,000
26	,,	blue-green	4,000
30	,,	grey	4,000
1	peso,	violet	2,000
2	pesos,	purple..	900
4	,,	blue	700
10	,,	green	500

The cliches are said to have been destroyed after the foregoing numbers had been overprinted.

The memory of the Madrid–Manila flight will be further perpetuated by the reproduction of a map of the route followed with a picture of the seaplane, inset upon certain charity-cum-postage stamps to be sold by Spanish post offices in aid of the Red Cross on September 15 to 17, in the denominations 15 centimos blue and orange, 20 centimos red and green, 30 centimos brown and blue, and 4 pesetas mauve and red.

Palos–Buenos Aires Flight Stamps

Another famous Spanish flight, that of Capt. Franco from Palos to Buenos Aires earlier in the present year is likewise commemorated by some special air post stamps to be issued on behalf of the Spanish Red Cross, concurrently with the above. They depict the seaplane " Plus Ultra," and are of the face values 5 centimos black and mauve, 10 centimos blue and black, 25 centimos red and black, 50 centimos orange and black, 1 peseta black and green.

New Canadian Air Post

Early in July a new contract air mail service was put in operation between Sioux Look-out and Red Lake, Ontario, with extensions to Woman Lake and Buch Lake areas, by the Patricia Airways and Exploration, Ltd. (Canada). The first mail flight to Red Lake took place on July 7, and to Woman Lake on August 2, 1926. Special cachets were used on these occasions in the form of a maple-leaf with appropriate inscriptions, and struck in green ink. Distinctive vignettes are also on sale at post offices in Ottawa, Toronto, Montreal, Winnipeg, Hamilton, Sunbury, North Bay, Cobalt, Tennis Kaming, Haileybury, Sioux Look-out and Red Lake, lithographed traverse rectangular format in a design by Mr. A. J. Agate, depicting the Curtiss aeroplane " Lark," which made a notable flight from New York to Red Lake in March last, flying over a wild landscape, and inscribed with the name of the operating concern at the top and " SPECIAL LARK DELIVERY—SIOUX LOOK-OUT TO PINE RIDGE AND RED LAKE " below. (Pine Ridge is the capital of the new province of Patricialand.) There are two varieties, printed in small sheets of eight, viz., red, green and yellow (25 cents), and red and blue-green (50 cent.). It is understood that the Elliot–Fairchild service continues to function thrice weekly between Rouza and Haileybury.

PUBLICATIONS RECEIVED

The Parachute " Salvator." S. A. Brevetti Aeronautici " Freri-Furmanik-Calabi," Via in Lucina 15, Rome.

Aeronautical Research Committee Reports and Memoranda: No. 1030 (*Ae.* 223).—Experiments with a Family of Airscrews, Including Effect of Tractor and Pusher Bodies, Part IV. : On the Effect of Placing an Airscrew in Various Positions within the Nose of a Streamline Body. By H. Bateman, H. C. H. Townend, and T. A. Kirkup. Feb., 1926. Price 1*s*. 3*d*. net. *No.* 1034 (*Ae.* 227).—The Efficiency of an Airscrew. By H. Glauert. May, 1926. Price 9*d*. net. *No.* 1040 (*Ae.* 229).—The Accuracy of the Vortex Theory of Airscrews in the Light of Recent Experimental Work and Its Application to Airscrew Design. By H. Glauert and C. N. H. Lock. June, 1926. Price 9*d*. net. H.M. Stationery Office, Kingsway, London, W.C.2.

U.S. National Advisory Committee Reports. No. 239. Power Output and Air Requirements of a Two-stroke Cycle Engine for Aeronautical Use. By C. R. Paton and Carlton Kemper. *No.* 242. Characteristics of a Twin-float Seaplane During Take-off. By John W. Crowley, junr., and K. M. Ronan. *No.* 244. Aerodynamic Characteristics of Airfoils.—IV. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

Technical Notes. No. 246. Test of a Model Propeller with Symmetrical Blade Sections. By E. P. Lesley. September, 1926. *No.* 247. The Drag of Airships. By Lieut. C. H. Havill, U.S.N. September, 1926. The National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

⁂ ⁂ ⁂ ⁂

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⁂ ⁂ ⁂ ⁂

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder ; i.c. = internal combustion ; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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14,563. J. B. STRAUSS. Mooring devices for airships. (260,648.)
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24,064. H. JUNKERS. Means for measuring altitude of aircraft. (249,069).

APPLIED FOR IN 1926

Published December 2, 1926

2,557. SCHNEIDER ET CIE. and J. FIEUX. Gyroscopic apparatus for providing stabilized platforms on aircraft, etc. (250,535.)
3,023. L. CHAUVIERE and G. MICHEL. Metal propeller. (252,121.)

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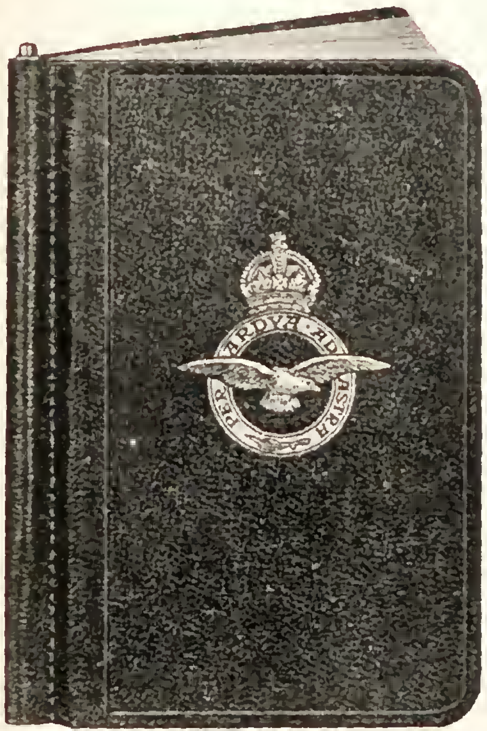

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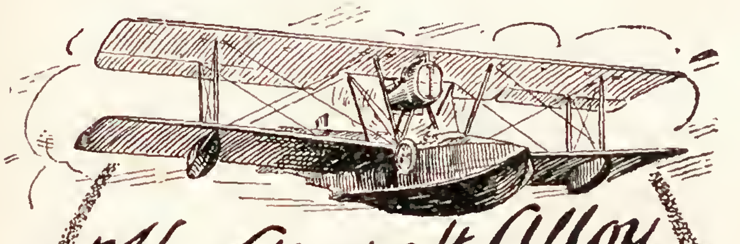

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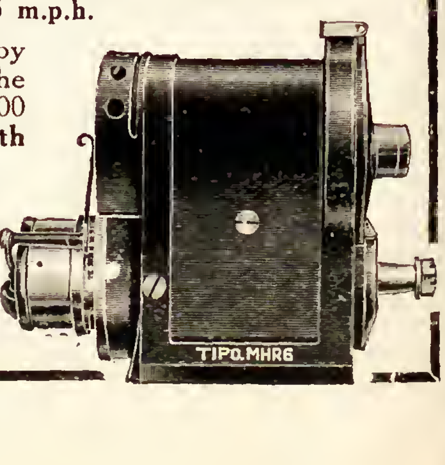

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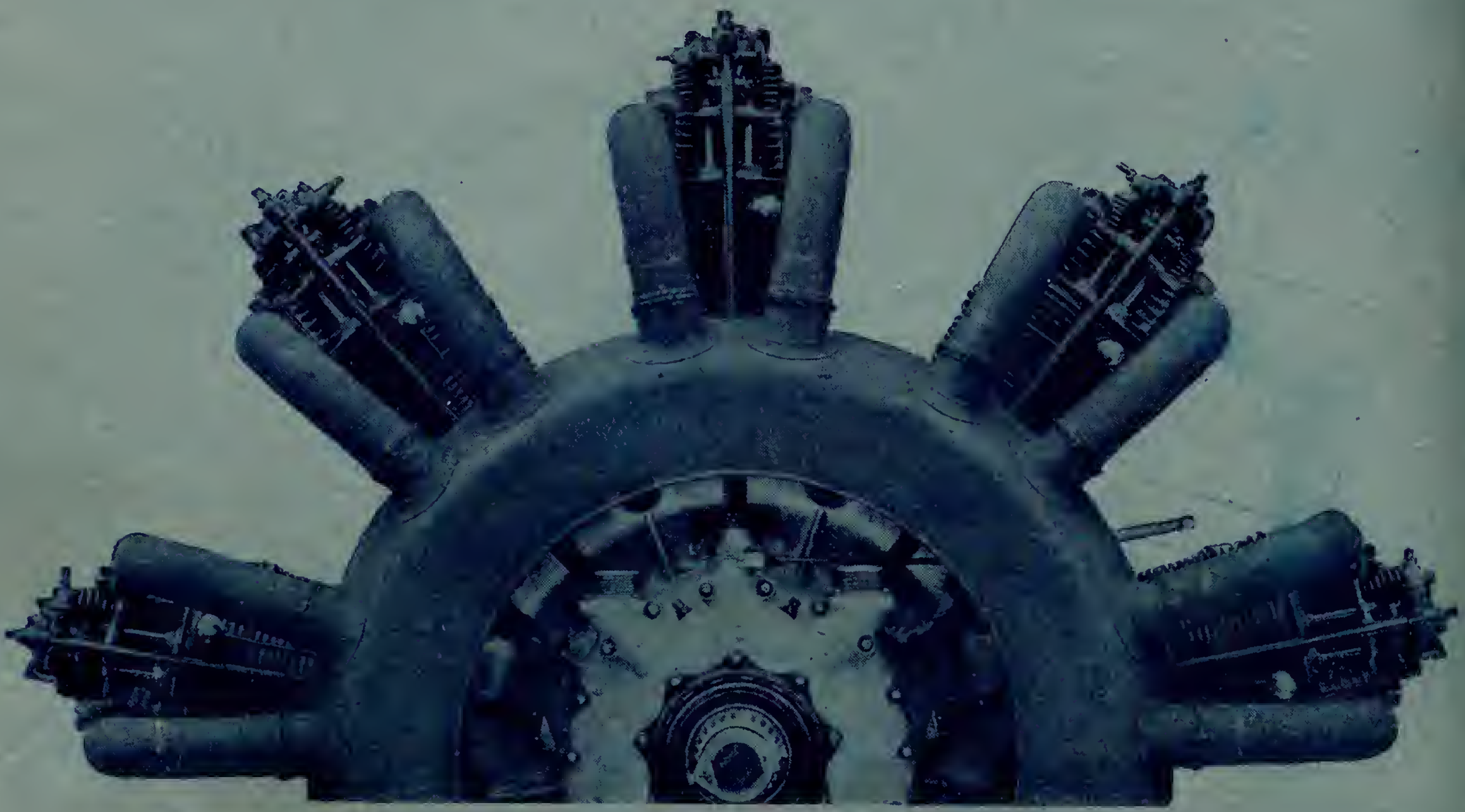

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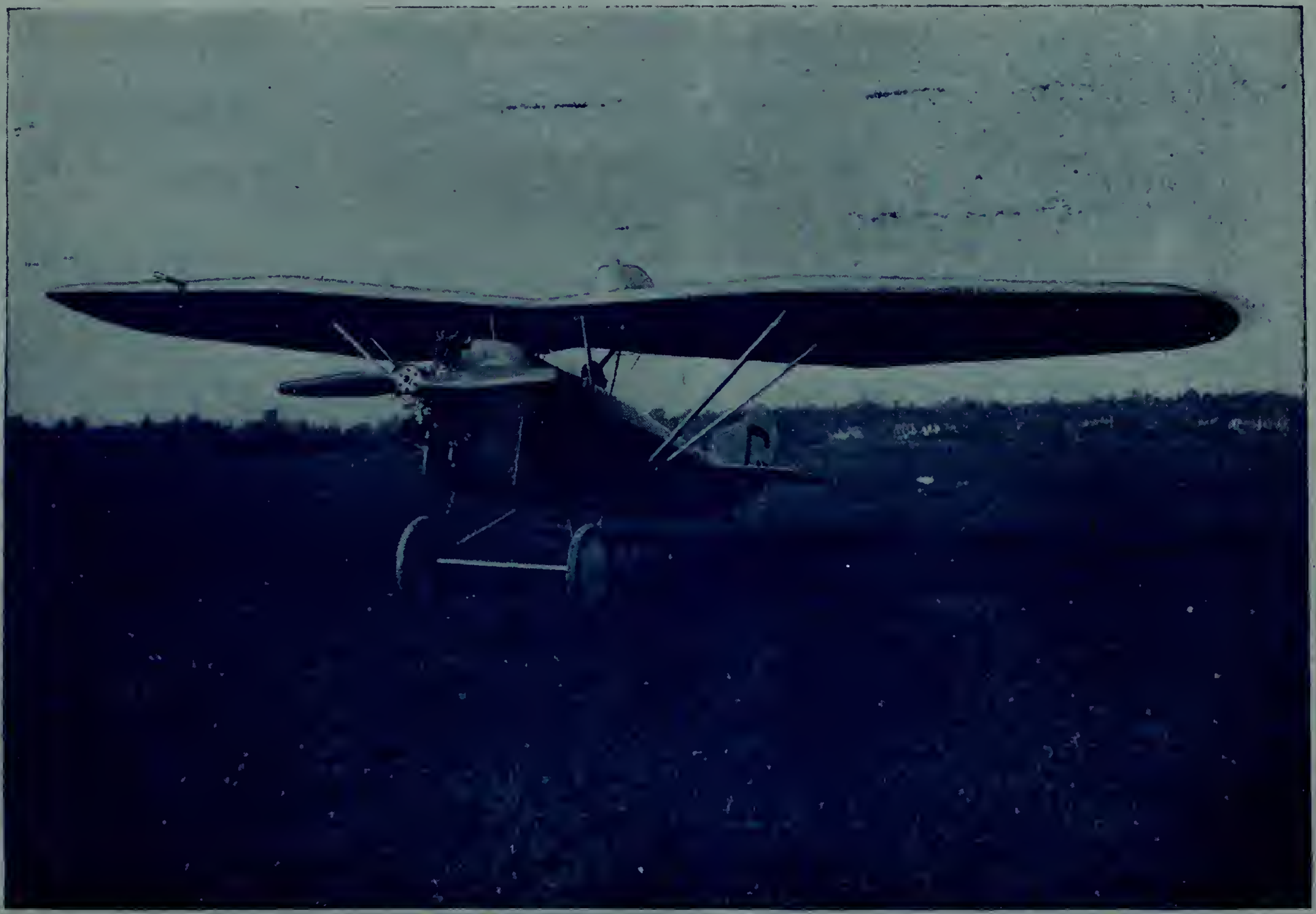

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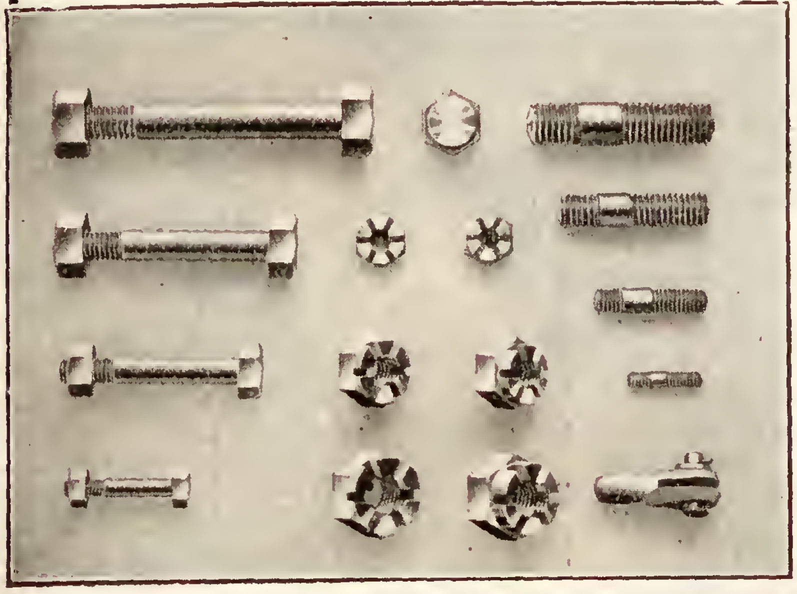

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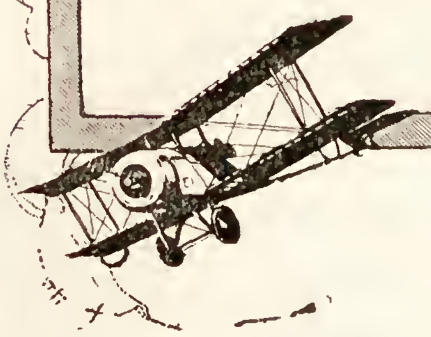

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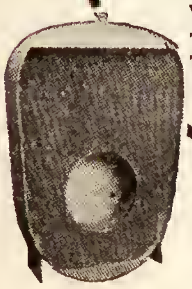

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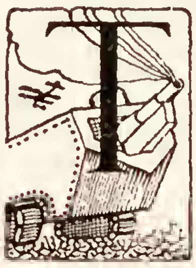
DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926
Dec. 3-19 .... Paris Aero Show
Dec. 9 .... Captain F. Entwistle, B.Sc. "Wind Structure in Relation to Air Navigation," before Inst.Ae.E.
Dec. 16 .... Wing-Comdr. C. D. Breeze, A.F.C., R.A.F. "The Training of Aircraft Apprentices," before R.Ae.S.

EDITORIAL COMMENT.

The Paris Aero Show



THE general impression left upon one's mind after a tour of the Grand Palais in the Champs Elysees, where the tenth International Aero Exhibition is at present being held, is that if there is little that is startlingly new, or strikingly original, the general quality of the exhibits, as far as aircraft are concerned, is considerably above that of previous Paris Aero Shows. Where hitherto the machines that gave one the impression of being purely experimental formed quite a large percentage, this year there are very few machines which have not been flown, and only one or two about which there can be any doubt as to whether they ever will fly. That in itself is something to the good. The fact that nearly all the weird designs which adorned (?) the earlier exhibitions have disappeared is a healthy sign that the French aircraft industry is beginning to settle down to really serious work. We say French, because, in spite of the presence of a few foreign exhibitors of aircraft, the *Salon* is in the main of a very French character.

Great Britain cannot be said to be adequately represented by one machine, no matter how good that machine may be, and the fact that owing to transport trouble this machine was late in making its appearance on its stand, early visitors to the Grand Palais had no opportunity of knowing there was a representative of British aviation in the show. When the transport fiends had done their worst, those responsible for the show arrangements worked like Trojans, and lost no time in getting the machine and stand into shape.

Considering the very great effort which France is making in the matter of commercial air lines, it cannot be said that the proportion of commercial to military types is large, nor that the commercial machines shown represent, except in one or two cases, any real advance compared with those shown at previous *Salons.* Apparently, much still remains to be done before the comfort of the passengers can equal that of a railway carriage, before absolute reliability can be expected, and before that safety, which should be the first aim in all civil aircraft design, is attained. Thus, it is significant that but a single French three-engined aircraft is exhibited—the Marcel Besson flying-boat with three Gnome-Rhone "Jupiter" engines. This machine shows an appreciation of the value of the three-engined type, but otherwise the machine itself does not impress one particularly. The wing structure, and especially the spars, look as if the structure had originally been planned in metal, but that for some reason it became necessary to change it to wood at the last moment. Whether this was actually the case we have been unable to ascertain, as those in charge of the stand appeared reluctant in vouchsafing any information whatever. It is even reported that in one case an artist making sketches (*not* a FLIGHT artist be it noted, as we were permitted to obtain a general view) was set upon and his sketches torn up. The obvious retort to this incident—which did little more than contribute for a moment to the gaiety of nations—is, of course, that one cannot seriously blame those in charge of the stand for not wishing to have their detail work published.

In the matter of seaplanes generally, the impression is easily formed that nothing at the show indicates that Great Britain need yet fear serious competition in this class of machine. Some improvement is certainly to be noted in the design and construction of flying-boat hulls, but there is still too much tendency to retain the flat-sided rigid hull and the single step. This is all the more remarkable when it is known that the second step can nowadays quite easily be made to prevent all tendency to porpoising.

As regards the land machines, one notices a tendency towards the disappearance of the *sesquiplan* in favour of the parasol monoplane, a type originated before the war by the Morane-Saulnier firm, and which has been adopted in quite a considerable number of machines, even large ones, at the show. Thus in the Nieuport-Delage machines, the type 42 (a *sesquiplan*) is shown next to its modern development the 48, which is a parasol monoplane. The Avimeta machine, an all-metal two-seater of fairly large span, is a parasol monoplane, as is also the large three-engined Besson flying-boat.

The thick-section wing does not appear to be making a great deal of headway, although one or two examples are exhibited in which the wing roots are of fairly thick section. On the other hand, the section of medium thickness seems to be making considerable headway.

While on the subject of wings, an English visitor cannot fail to be struck by the apparent disregard for "down-loads," which most French designers affect. In many cases the answer may be that the particular machine is not intended to be able to fly upside down, nor to be dived steeply. Doubtless that is perfectly true, but any aeroplane, when flying in fog or clouds, is apt to be placed, without the pilot momentarily being aware of the fact, in all sorts of unintentional attitudes, and it would seem prudent to guard against such contingencies.

On the subject of engines, it can, we think, be said that these are of uniformly high quality. That the radial air-cooled type is making great headway is very obvious. Thus the "Jupiter" alone is fitted on something like 50 per cent. of the machines exhibited, while the radial air-cooled type generally is found on an even larger percentage. The manner in which the radial air-cooled engine is coming to the fore is, perhaps, nowhere better illustrated than in the case of the Lorraine-Dietrich firm, on whose stand are shown two radials bearing a very strong resemblance to the Armstrong-Siddeley engines, suggesting that they could only have been evolved through the amicable co-operation of the two firms, by which the French house has had the benefit of the Armstrong-Siddeley experience. The Armstrong-Siddeley engines themselves are attracting a good deal of attention, and the extremely useful series of four engines, in which three types have the same cylinders and pistons, &c., is favourably commented upon.

In the water-cooled class, the Vee type seems still to predominate, although the W, or "broad arrow" formation is also to be found in large numbers. The increase in the number of engine types of more than 500 h.p. is another notable feature of the *Salon*, and engines of 700 and 800 h.p., or even more, are no rare sight this year. The sleeve-valve engine is another type that appears to be coming along, and it is, perhaps, significant that in the great million-francs engine competition a sleeve-valve engine, the Panhard-Levassor, secured second place, while showing the lowest petrol consumption of any in the competition. Thus this type of engine may be assumed to have proved itself, and its further development will be watched with interest.

Of really novel types there are, as far as we have been able to discover, but two on view. One of these is the water-cooled horizontally opposed "Caffort," which is stated to develop 500 h.p. It is as yet purely an experimental engine, but we are informed that it has in all run for 13 hours, so that at any rate "it works." This engine is mainly intended, we gather, for use on thick-wing machines, in which it can be buried inside the wing without adding anything to the head resistance of the machine. Another advantage of the flat type would seem to be that in certain types of machine a much better view might be provided. The type seems worth developing, and might be given consideration on our side of the Channel also.

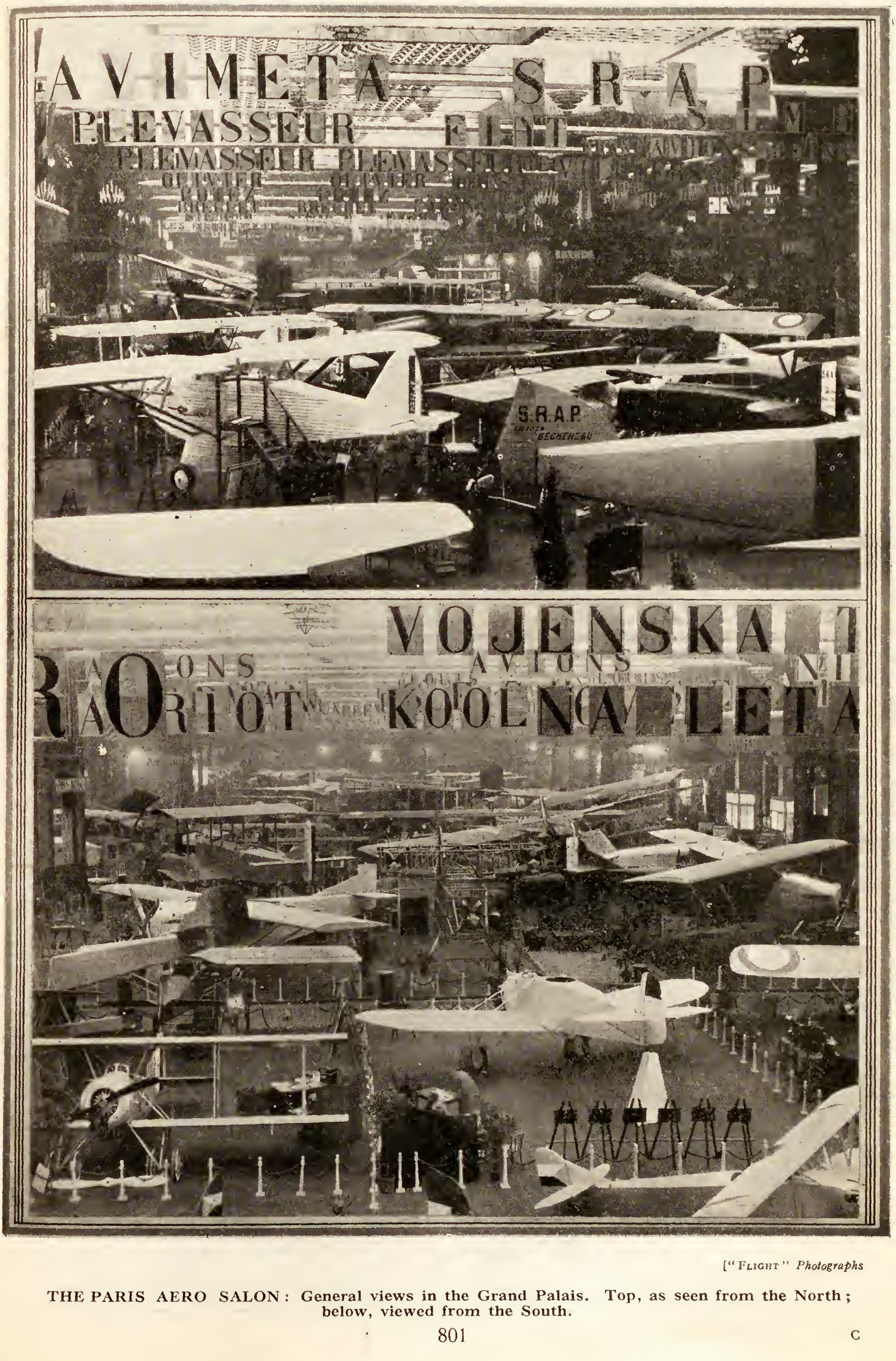
The only other new type is the Italian "Cappa" engine, which is stated to develop 450 h.p. It looks like a box of trapezoidal cross section, with the propeller hub at one end and what appears to be some form or fan or blower at the other. Whether it is a forced induction type of two-stroke we have been unable to discover. Nothing could be gathered on the stand, but the required information was "incessantly expected."

◆ ◆ ◆ ◆

Errata

In the unavoidable "rush" that attends the preparation of such features as last week's special British Aircraft Section errors are bound to pass undetected. For instance, last week, in referring to the Vickers machines, the speed of 115 m.p.h. quoted for the "Vespa" should have been indicated as being "at 6,000 metres," and the speed of 126½ m.p.h. for the "Vixen" Landplane, heavy, "at 3,000 metres."

Again, on p. 786*w* of the same issue (Westland Aircraft Works), in referring to Capt. Hill's flights on the "tailless aeroplane," we stated that he "flew the machine in altitudes, etc.," This, of course, should have read "in *attitudes*"



[" Flight " *Photographs*

THE PARIS AERO SALON: General views in the Grand Palais. Top, as seen from the North; below, viewed from the South.

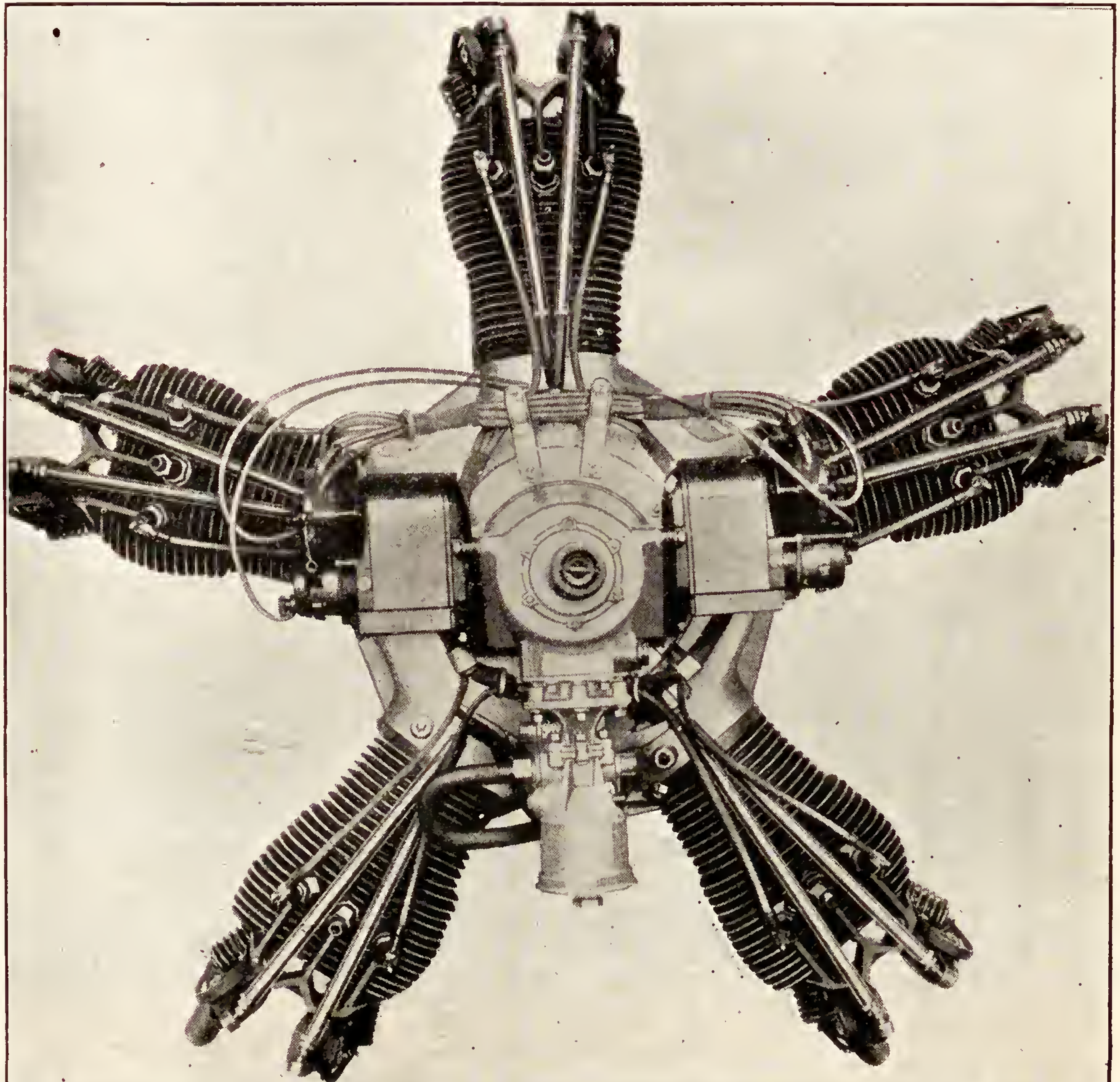
The PARIS AERO SHOW 1926

AERO ENGINES AT THE SALON

In our issue last week, we published illustrations and data relating to most of the aircraft exhibited at Paris, and with one or two exceptions all the machines stated in our advance report to be intended for the show have actually turned up. This week we continue with brief specifications of some of the more important aero engines to be seen at this year's *Salon*.

ARMSTRONG SIDDELEY MOTORS, LTD.

The exhibits of this British firm include a complete range of engines from the little "Genet" to the famous "Jaguar" used by Sir Alan Cobham on his flights to Cape Town and back, and to Australia and back. The stand, although under the gallery to some extent, is fairly prominently situated, and is attracting a good deal of attention, the four engines being beautifully finished and extremely neatly mounted on wooden bases supporting aluminium columns on which the engines rest. Three of the Armstrong-Siddeley engines are



British Engines at the Paris Show: The Armstrong-Siddeley "Mongoose," of 120 h.p.

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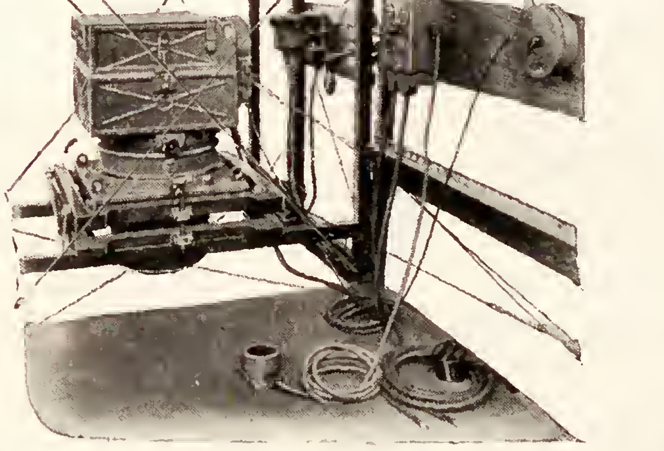

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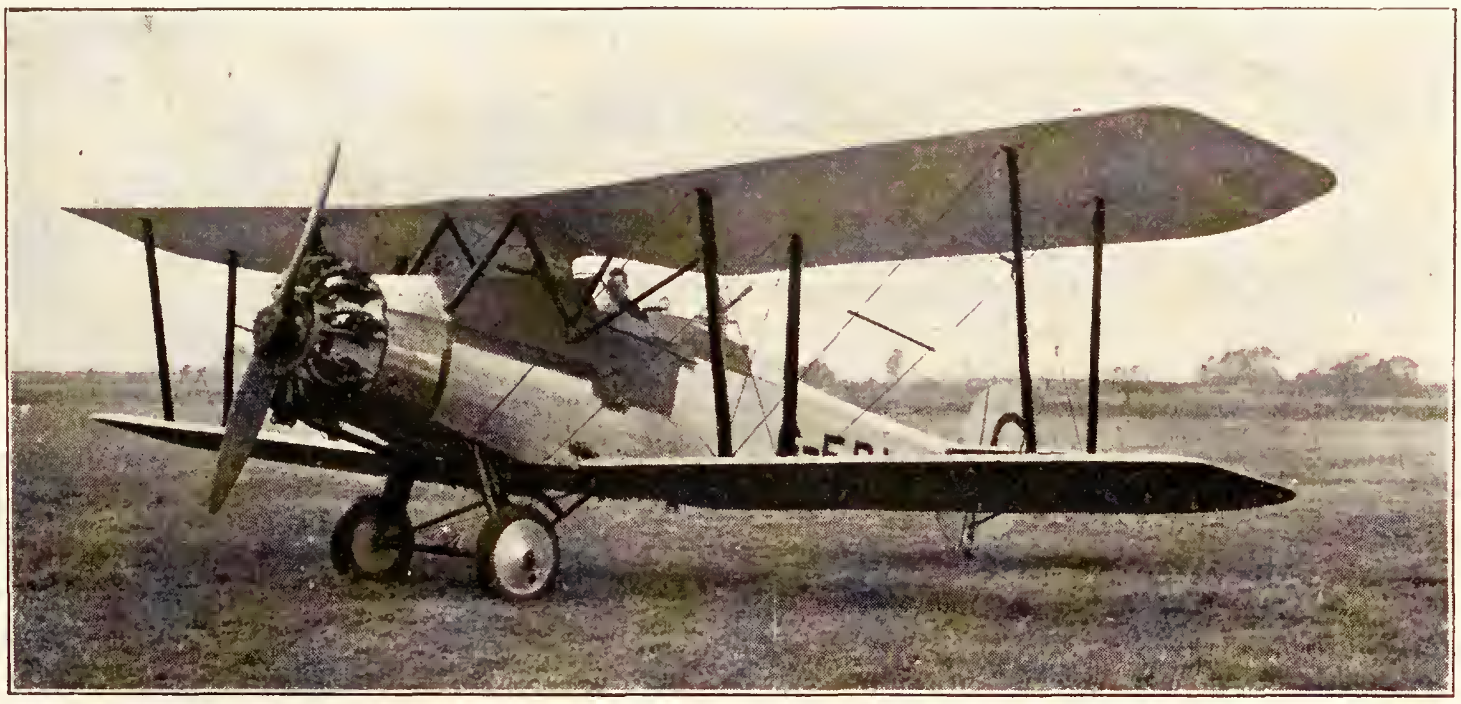

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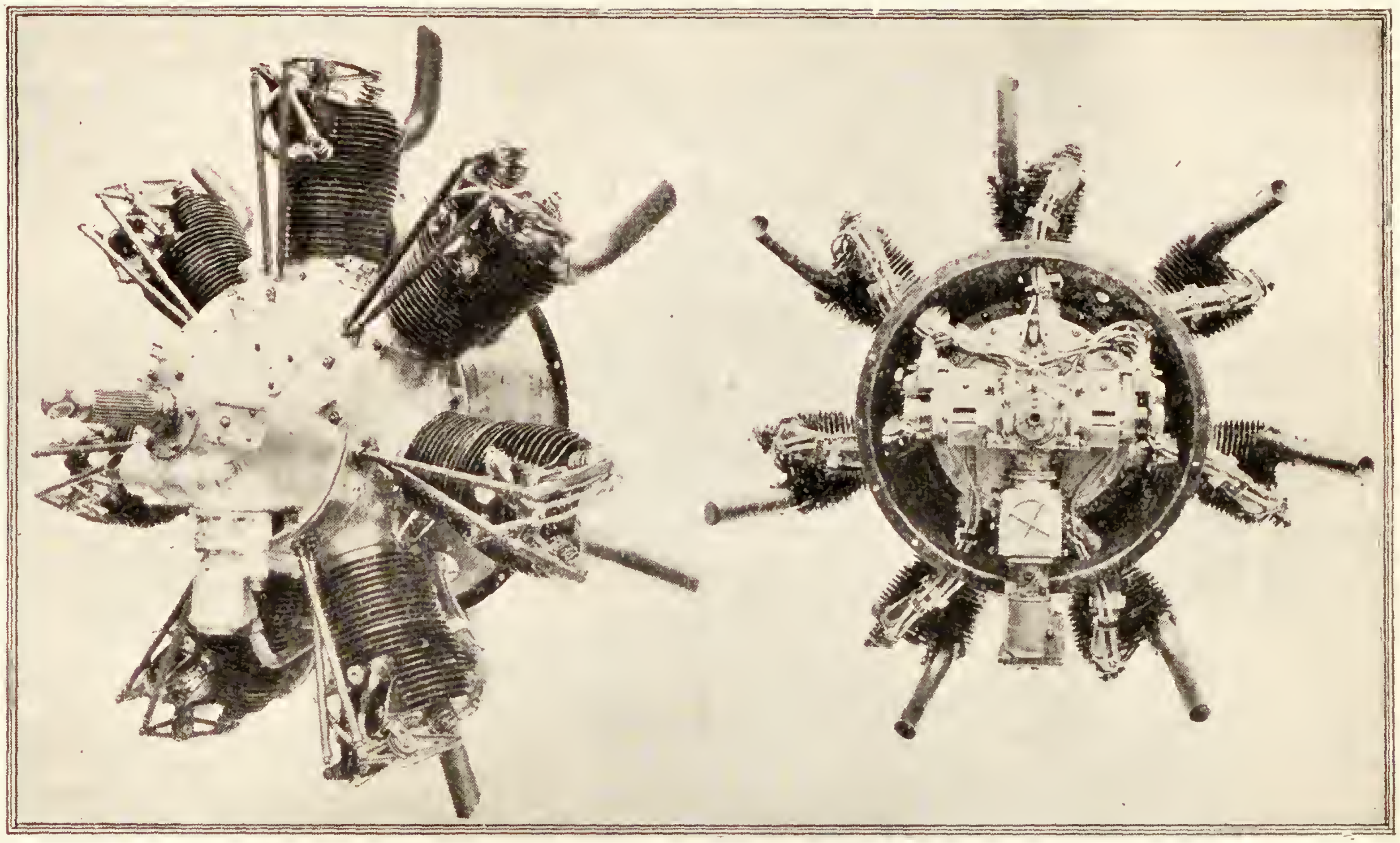
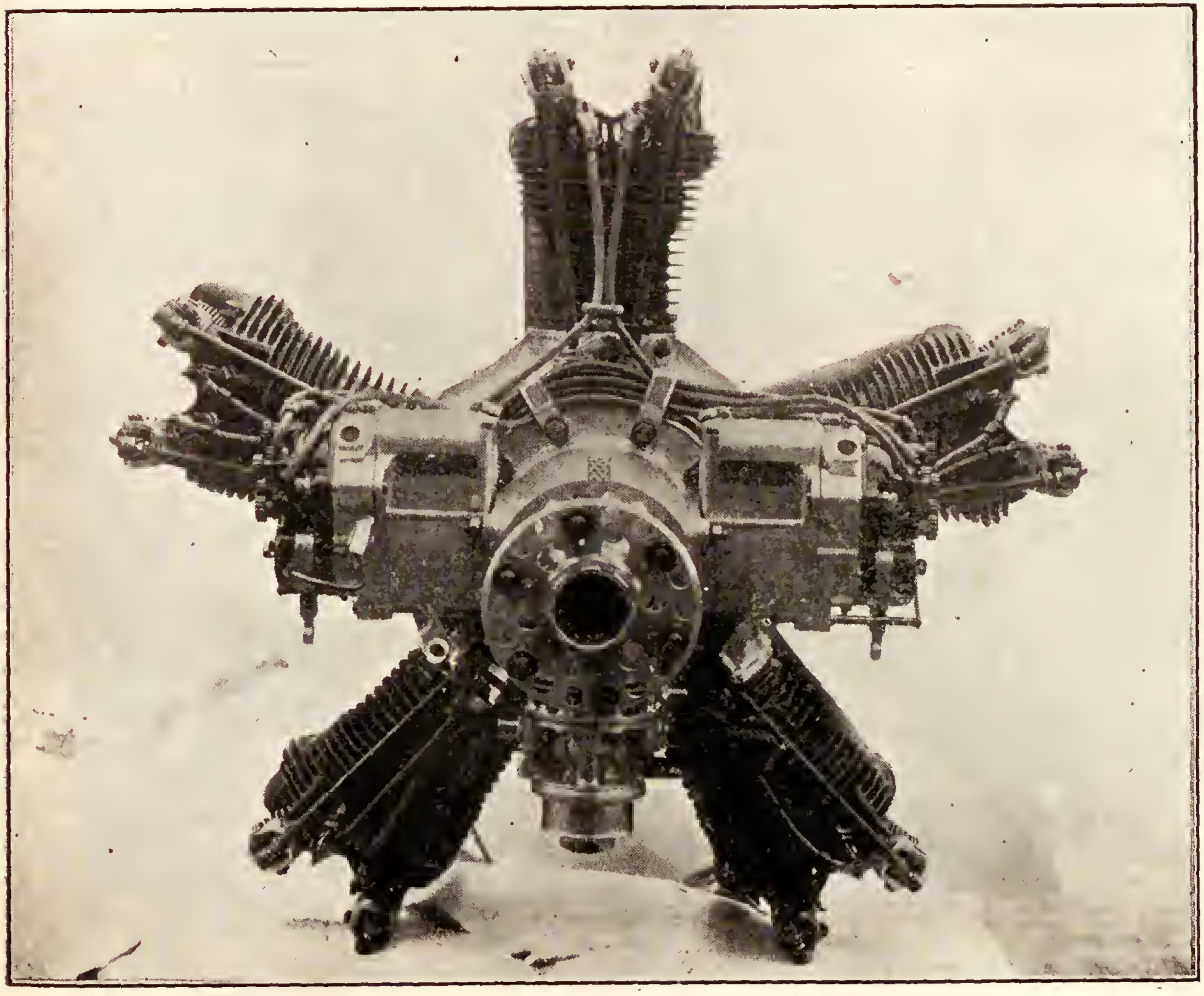


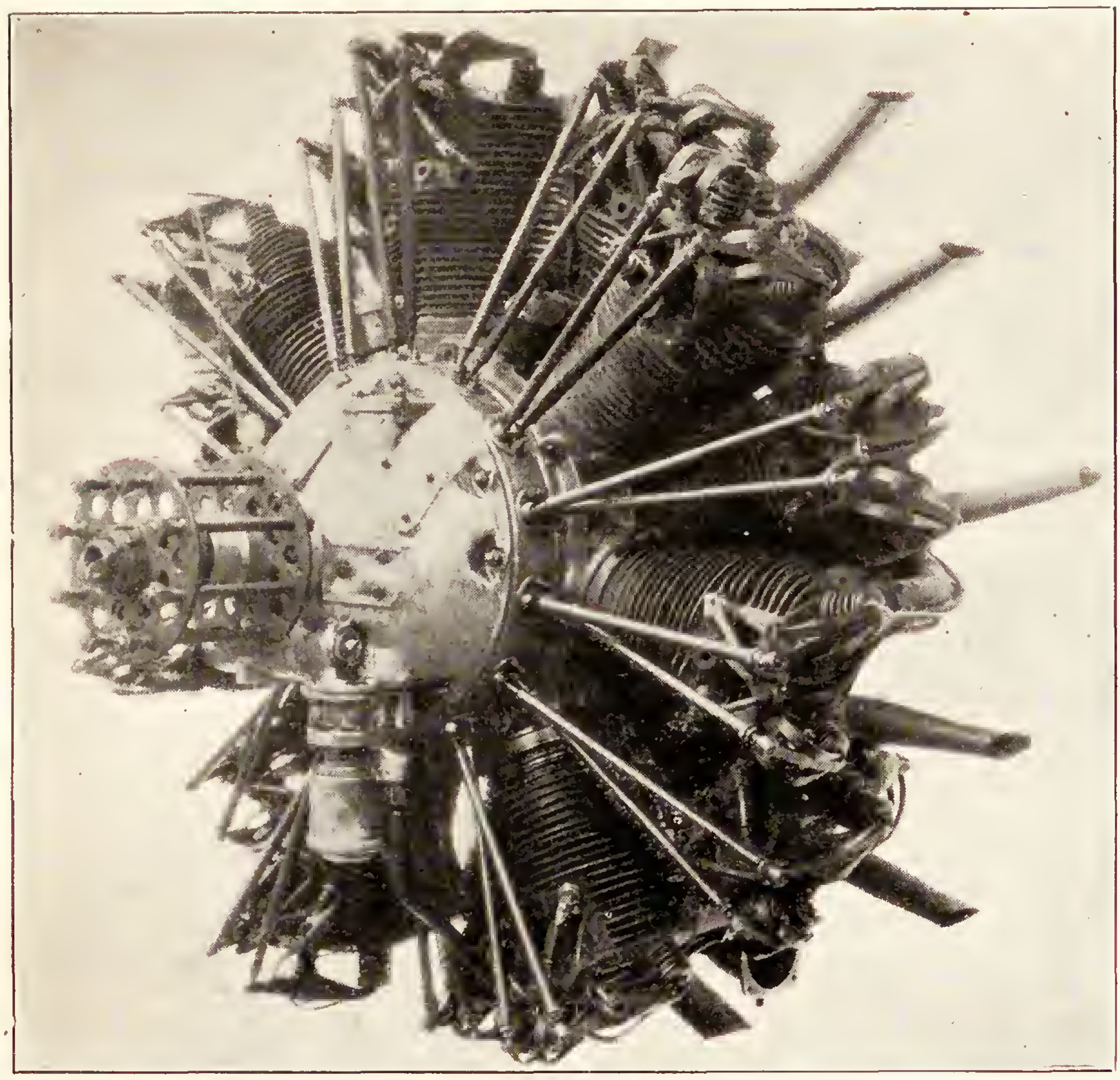
BRITISH ENGINES AT THE PARIS SHOW: Two views of the Armstrong-Siddeley Lynx, that on the right showing the crankcase cover removed.

already well known to readers of FLIGHT, and will not, therefore require, a very detailed reference here, but the fourth, the "Mongoose," is an entirely new type which has not been shown in public before, and we therefore propose to deal with this engine at rather more length. In order, however, to make our account complete, we give below the specifications of the three older types of Armstrong-Siddeley engines.

The "Jaguar" is a 14-cylinder radial air cooled engine with its cylinders arranged in two rows of 7 each, the rows being staggered so that the cylinders of the back row are in line with the openings between those of the front row. The "Jaguar" has a bore and stroke of 125 mm. and 140 mm. respectively, giving a total capacity of 24·781 litres. The compression ratio is 5 to 1 and the power of the engine is 400 h.p. to 425 h.p. The normal speed is 1,700 r.p.m. The petrol consumption is 0·56 pint per h.p. per hour, and the



British Engines at the Paris Show: The Armstrong-Siddeley 65–75 h.p. "Genet."



BRITISH ENGINES AT THE PARIS AERO SHOW: The 400 h.p. "Jaguar."

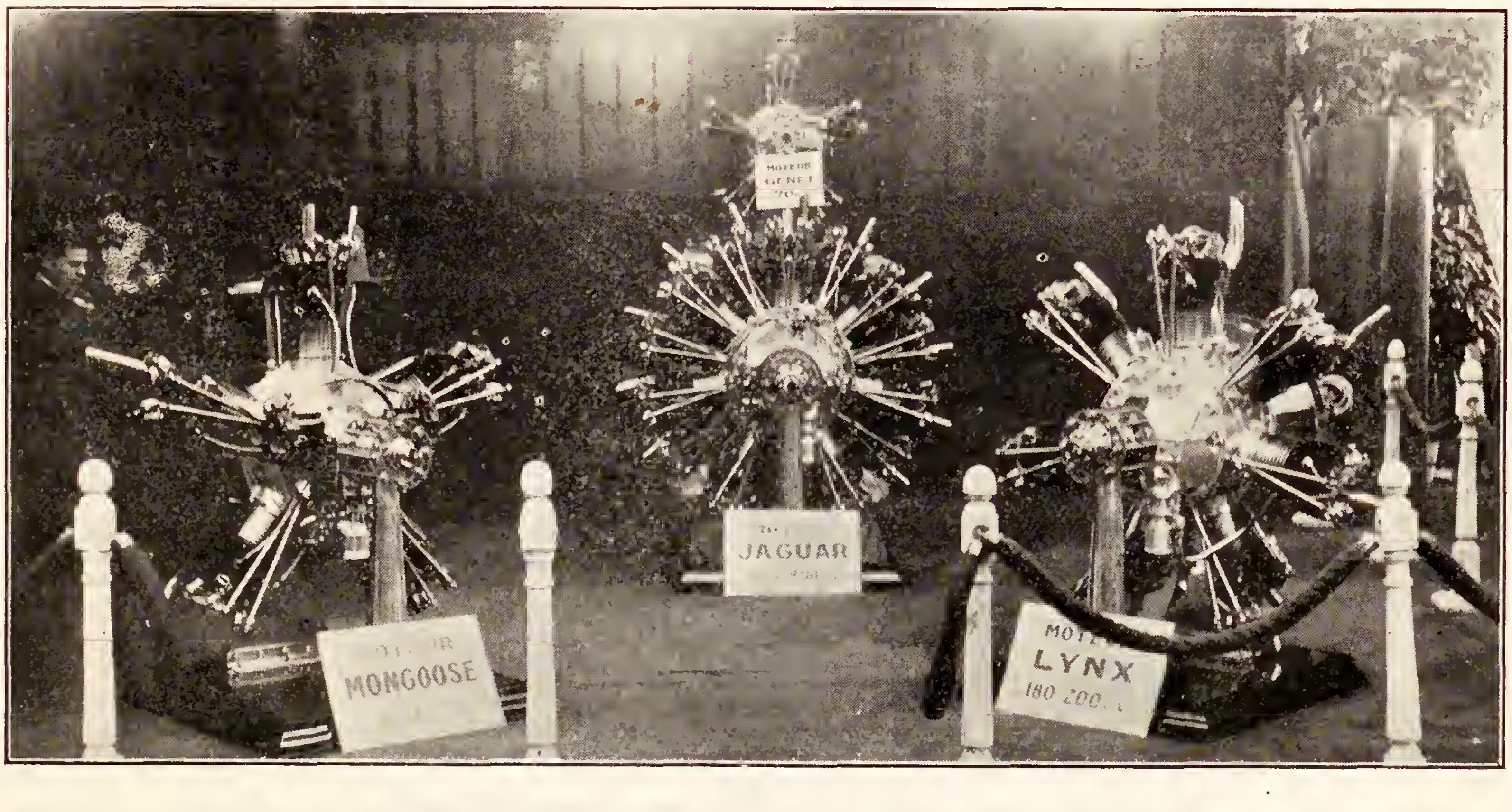
oil consumption 0·025 pint per h.p. per hour. The weight of the engine dry is 348 kg.

The "Lynx" may be said to be one-half of the "Jaguar" in that it has the same cylinders and pistons, but only one row of 7 cylinders as against the 14 cylinders of the more powerful model. The power is 180 to 210 h.p., and the normal speed 1,620 r.p.m. The bore, stroke and compression ratio are the same as those of the "Jaguar," as are also the petrol and oil consumptions. The cubic capacity is 12·395 litres. The weight of the engine is 174 kg.

The "Genet" is a radial air-cooled five-cylinder engine, designed for light aeroplanes such as those used by the British Light Aeroplane Clubs, and by a number of private owner-pilots. In general design it follows the lines of the two more powerful types, the following being its main characteristics: Bore, 100 mm.; stroke, 100 mm.; capacity, 3·92 litres; compression ratio, 5·2 to 1; power, 65/75 h.p.; normal speed, 1,850 r.p.m. The petrol consumption is 0·575 pint per horse power per hour, and the oil consumption 0·03 pint per horse power per hour. The weight is 76 kg.

The "Mongoose" is a medium-powered air-cooled five-cylinder engine of the same general type as the other Armstrong-Siddeley models. The crankcase is of aluminium and carries on its front cover the breather, oil pumps, and two Watford magnetos, which are cross driven from the crankshaft, and thus placed most accessibly. The rear cover of the crankcase incorporates the cover for the induction fan, with which, like the "Jaguar" and "Lynx," the "Mongoose" is equipped. To this cover is fitted the oil-heated induction elbow to which is attached the Zenith carburettor. Inside the induction cover is the mixing fan, the mixture then reaching the cylinders through five induction pipes. The design of the cylinders and heads incorporates the well-known patented Armstrong-Siddeley practice, the alloy heads being screwed, shrunk and locked into the steel forged cylinders, which in their turn are screwed into liners in the case and then locked up by clamping rings. The cylinder heads accommodate overhead valves which are returned to their shrunk-in aluminium-bronze seats by duplex springs. The sparking plugs are screwed into phosphor-bronze bushes, which are also screwed and shrunk into the cylinder heads.

The valve driving mechanism incorporates a six to one



BRITISH ENGINES AT THE PARIS SHOW: The Armstrong-Siddeley Stand, with four engines displayed.

epicyclic gear reduction between the crankshaft and the cam drum, the latter revolving in the same direction as the crank. The cams operate roller-ended tappets which drive tubular push rods carrying the necessary means for adjustment at their upper ends. The single-throw crankshaft runs on three roller bearings, two being located one on each side of the webs, and one at the front end where a ball-thrust race is also provided.

Lubrication is on the dry sump principle. The suction pump, which is located on the front cover and driven by bevels off the crankshaft, draws filtered oil from the small chamber at the base of the case, and forces it to the induction elbow on the rear cover, and thence back to the oil tank. The pressure pump, which is also located on the front cover and driven by bevels from the crankshaft, forces the oil from the tank through a second filter, and up through the centre of the pump-driving shaft to the crankshaft. Thence the oil passes to the crankpin, splash being relied upon to feed the pistons and small ends, and the timing gear being supplied from the overflow.

The master connecting rod and four auxiliary rods are formed from steel forgings, and the pistons are forgings of "Y" alloy. Fully floating gudgeon pins are secured by circlips in the piston bosses. The pistons are fitted with two pressure rings and one oil-retaining ring.

Following are the main characteristics of the Armstrong-Siddeley "Mongoose" engine: No. of cylinders, 5; cooling, air; bore, 127 mm.; stroke, 140 mm.; capacity, 8·85 litres; compression ratio, 5 to 1; power 125 h.p; normal speed, 1,620 r.p.m.; petrol consumption at normal power, 7 galls. per hour; oil consumption at normal power 2·5 pints per hour; weight, 153·8 kg.

THE BRISTOL ENGINES

THE range of engines exhibited by the Bristol Aeroplane Co., Ltd., includes the famous "Jupiter" (which is found on something like 50 per cent. of the machines exhibited), the "Lucifer" and the "Cherub." These engines have all been described and illustrated in FLIGHT from time to time, and so will be familiar to our readers, while all three have "made good" in their respective spheres, so that their work will be equally familiar. At Paris the Bristol stand is rather out of the way in that it is situated in a corner and under the gallery, but the reputation of the engines is such that there is never any lack of visitors on the stand, and genial Mr. Fernie is kept busy supplying engine booklets giving full particulars, not to mention the very beautiful series of Bristol postcards which one may obtain on this stand.

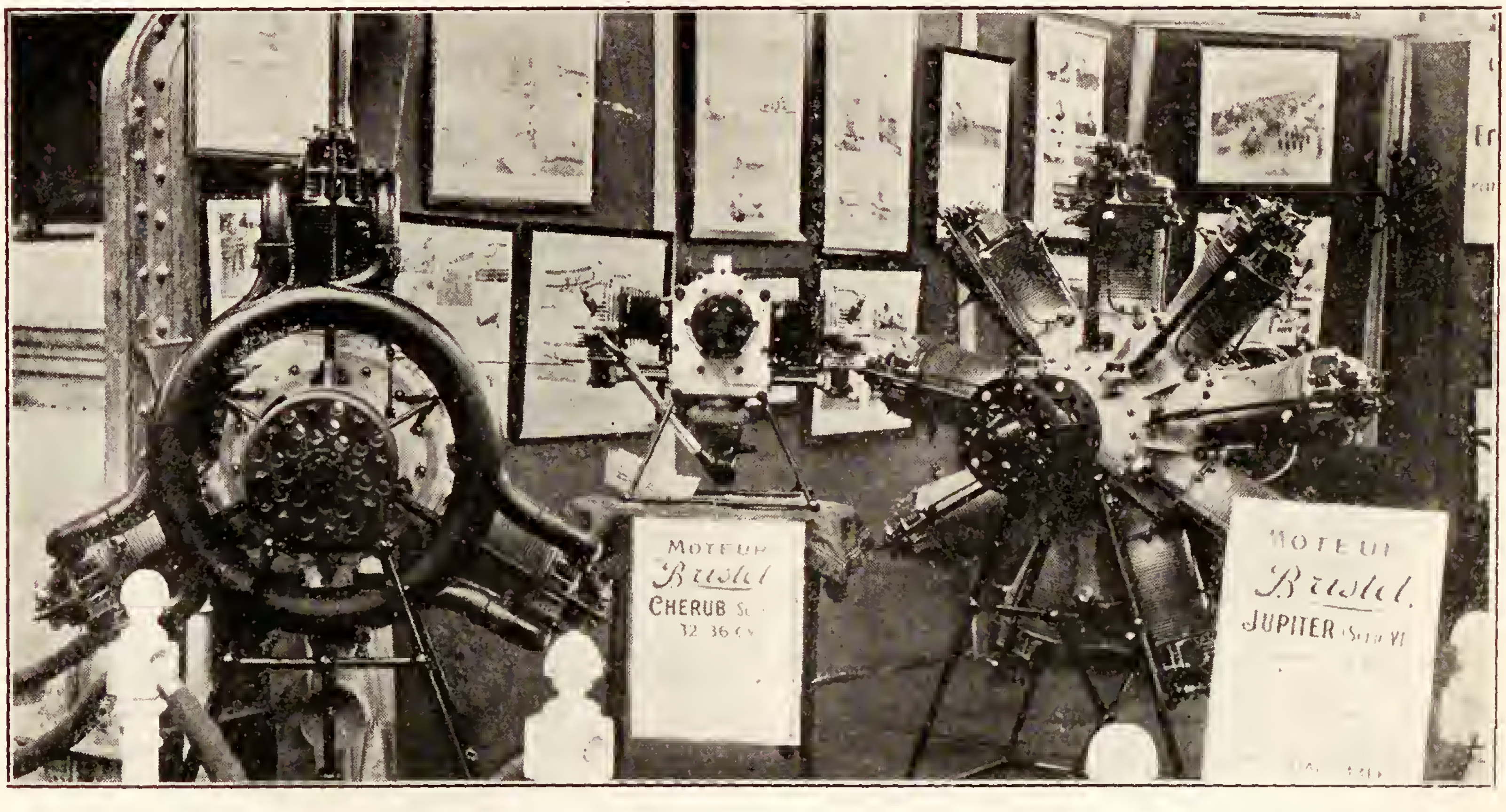
The fact that the Bristol engines are already so well known makes detailed descriptions unnecessary. Each of the three types has proved itself to be up to the high standard which the Bristol firm has maintained since the earliest days of flying, and perhaps it would be difficult to find a better proof of the esteem in which Bristol engines are held than that provided by the manner in which they have been taken up abroad. Take the "Jupiter," for instance. This engine, which is of a power and class for which there is a great variety of uses, is now being manufactured under licence in France, Czechoslovakia, Italy and Japan, with the result that the "Jupiter" engine is now to be found in service in a very large number of countries, such as France, Germany, Norway, Finland, Sweden, Czechoslovakia, Japan, Holland, and Italy, to mention but a few. To take but one of these countries, France, we believe that since the Gnôme and Rhône Company obtained licence to build "Jupiters" in France, the French Government has placed orders for something like 800 engines. These, as is well known, have been used in an extraordinary variety of types of aircraft. In commercial aircraft, also, the "Jupiter" is employed to a very large extent, its low specific weight enabling machines in which it is fitted to carry a proportionately greater useful or paying load.

The smaller Bristol engine, the "Lucifer," has been used very extensively, not only at the Bristol flying school at Filton, but also abroad for school and other purposes. At the Bristol school, which has been in operation for about three and a half years, over 600 pupils have taken courses, and there has never been a single forced landing due to engine trouble.

The "Cherub," the smallest of the Bristol "family," also has a very distinguished record, one of its most recent successes being, of course, the winning of the first prize offered by the *Daily Mail* for two-seater light aeroplanes at Lympne, this competition having been won by a Hawker "Cygnet" with Bristol "Cherub" engine. Abroad, also, the "Cherub" has worthily upheld British prestige, and in this connection it will suffice if we recall the recent flight by the German pilot von Conta across the Alps from Munich to Rome in a Messerschmitt monoplane, fitted with the Bristol "Cherub."

Following are the main characteristics of the Bristol "Jupiter" series VI exhibited at Paris: Nine-cylinder, radial air-cooled; bore, 146 mm.; stroke, 190 mm.; total cylinder capacity, 28·7 litres; normal speed, 1,700 r.p.m.; maximum speed, 1,870 r.p.m.; compression ratio, 6·3 to 1; power at 1,625 metres: 425 h.p. at 1,700 r.p.m., 465 h.p. at 1,870 r.p.m.; petrol consumption at maximum power, 132 litres per hour; oil, 5·6 litres per hour; petrol consumption at normal power, 109 litres per hour; oil, 4·5 litres per hour; weight, 331 kgs.

The three-cylinder radial air-cooled "Lucifer" has the following characteristics: Bore, 146 mm.; stroke, 159 mm.;



"FLIGHT" *Photograph*

BRITISH ENGINES AT THE PARIS SHOW: The three Bristol representatives shown above are from left to right, the 120 h.p. "Lucifer" series IV, the 32-36 h.p. "Cherub" series III, and the 425 h.p. "Jupiter" series VI.

total swept volume, 8 litres ; compression ratio, 5·3 to 1 ; normal speed, 1,700 r.p.m. ; maximum, 1,870 r.p.m. ; normal power, 130 b.h.p. ; maximum, 140 b.h.p. ; petrol consumption at maximum power, 36 litres ; oil, 2·2 litres per hour ; petrol consumption at normal power, 27 litres per hour ; oil, 1·2 litres ; weight of engine, 150 kgs.

The main data relating to the "Cherub" series III are : Type, two-cylinder opposed air-cooled ; bore, 90 mm. ; stroke, 96 mm. ; cubic capacity, 1·228 litres ; compression ratio, 5·5 to 1 ; normal power, 32 h.p. at 2,900 r.p.m. ; maximum power (for 5 minutes), 36 h.p. at 3,200 r.p.m. ; petrol consumption at normal power, 9 litres per hour ; oil, 0·57 litres ; weight of engine, 45·36 kgs.

It is regretted that conditions at the Grand Palais were such that it was found difficult to photograph the Bristol engines on the stand, but some very excellent photographs appear elsewhere in this issue of Flight.

BREITFELD, DANEK I SPOL

This Czechoslovak firm, of Prague, commenced the manufacture of aero engines as long ago as 1914, when the types produced were built under licence from the "Hieronymus" company. In 1922 the firm commenced original design, the first proprietary engine to be turned out being the "Blesk," a six-cylinder vertical water-cooled of 100 h.p., having a bore of 120 mm. and a stroke of 140 mm. This engine was successful within the limits imposed by a low-power output, and further types were then developed. The outcome has been a series of three engines, all of the high-compression type, designed to maintain their power up to an altitude of 3,000 m.

The "Perun I" is a six-cylinder, vertical water-cooled of 190 h.p., having a bore of 150 mm. and a stroke of 180 mm. Its normal speed is 1,400 r.p.m., and the petrol consumption is 190 grs. per h.p./hour, while the oil consumption is 12 grs. per h.p./hour The weight of the engine dry is 285 kg

"Perun II" is a slightly more powerful version of the same type, with a bore of 160 mm. and a stroke of 190 mm., developing 240 h.p. at a normal speed of 1,400 r.p.m. Its weight is 315 kg., and the petrol consumption is 190 grs. per h.p./hour, while the oil consumption is 12 grs. perh.p./hour.

The most powerful engine produced by this firm up to date is the 500 h.p. "BD," a 12-cylinder water-cooled Vee type with a bore of 160 mm. and a stroke of 190 mm. The normal speed is 1,400 r.p.m., and the weight of the engine is 550 kg. Whereas the smaller models have two valves per cylinder, the "BD" has four. This engine also is claimed to maintain its power up to an altitude of 3,000 m.

THE "CAFFORT" ENGINE

In some ways the most interesting engine at the show, because it represents an attempt at solving the problem of engine-head resistance, is the new 500 h.p. engine designed and constructed by the French firm of Caffort Frères, which is exhibited at Paris next to the Bristol stand. This engine, which is apt to be overlooked, is well worth an inspection, and, although relatively little information is available concerning it—the engine having been but recently finished, and, in fact, was running a couple of days before the opening of the Salon—the general principle is simple enough and easily followed. That some of the details may require modification before this engine becomes a practical proposition is, of course, more than likely. The firm that has produced it is, we understand, a very old French firm, but has had no previous experience of aero-engine work, so that one should not be over-critical in judging detail.

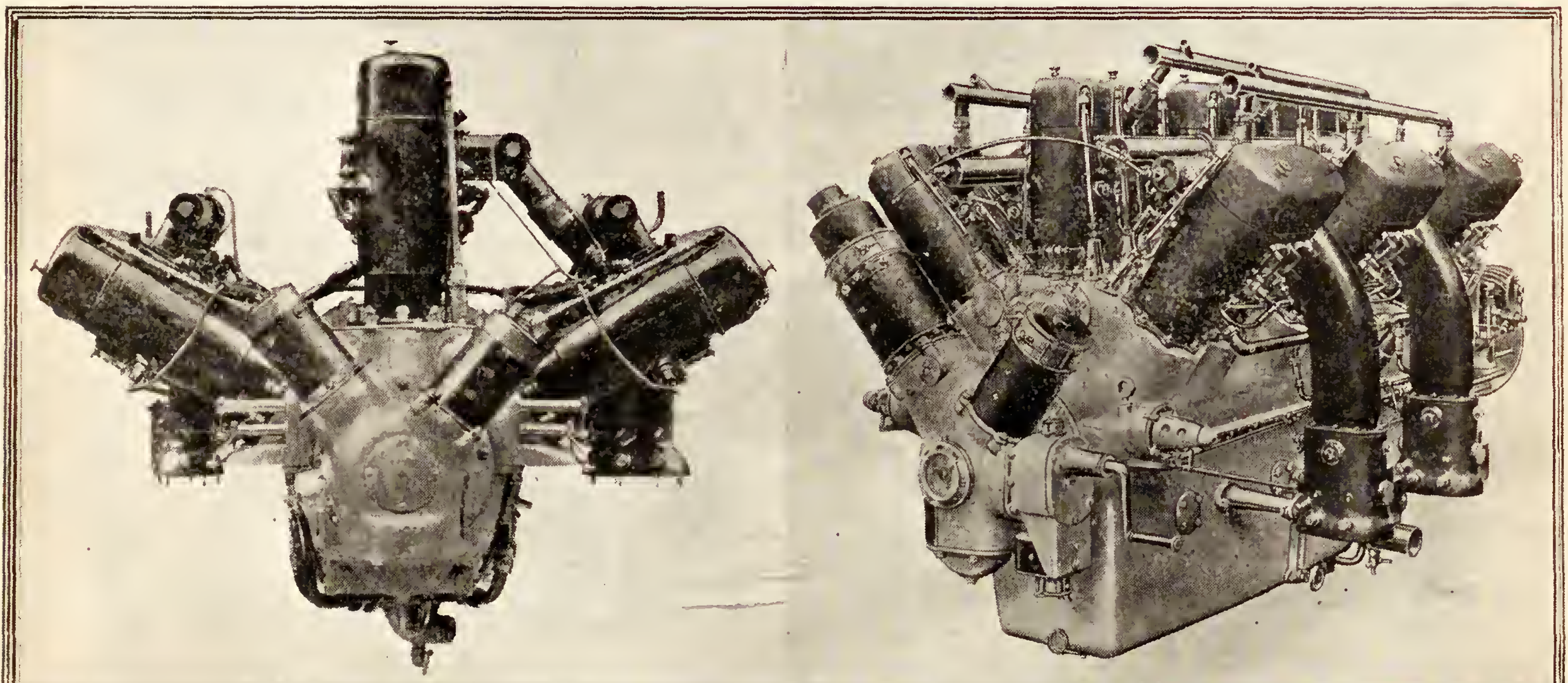
The main principle of the "Caffort" engine is that it has its 12 cylinders disposed in two rows of 6 each, the two rows being horizontal and placed at an angle of 180°. In other words, the engine is of the horizontally opposed type. We gather that the object which the designer had in view was to produce an engine capable of being tucked away neatly inside a thick wing, thus saving the head resistance offered by the more orthodox types of engine. This being the object, water cooling was adopted as a necessary corollary, and there still remains the problem of the radiator and its head resistance. That, however, is a matter over which the engine designer has little or no control. It must rest with the aircraft designer, and, presumably, the wing-surface type of radiator would be the logical type to adopt in conjunction with the "Caffort" engine.

It is regretted that the lighting arrangements of this year's Paris Salon were such that it was found impossible to take photographs of quite a number of interesting exhibits, and among these was the "Caffort" engine. The preliminary test runs of this engine were carried out so recently that the firm has had no time to have photographs taken, and it is therefore impossible for us to place before our readers any illustration of it. The following brief notes on its more important features will have to serve for the time being.

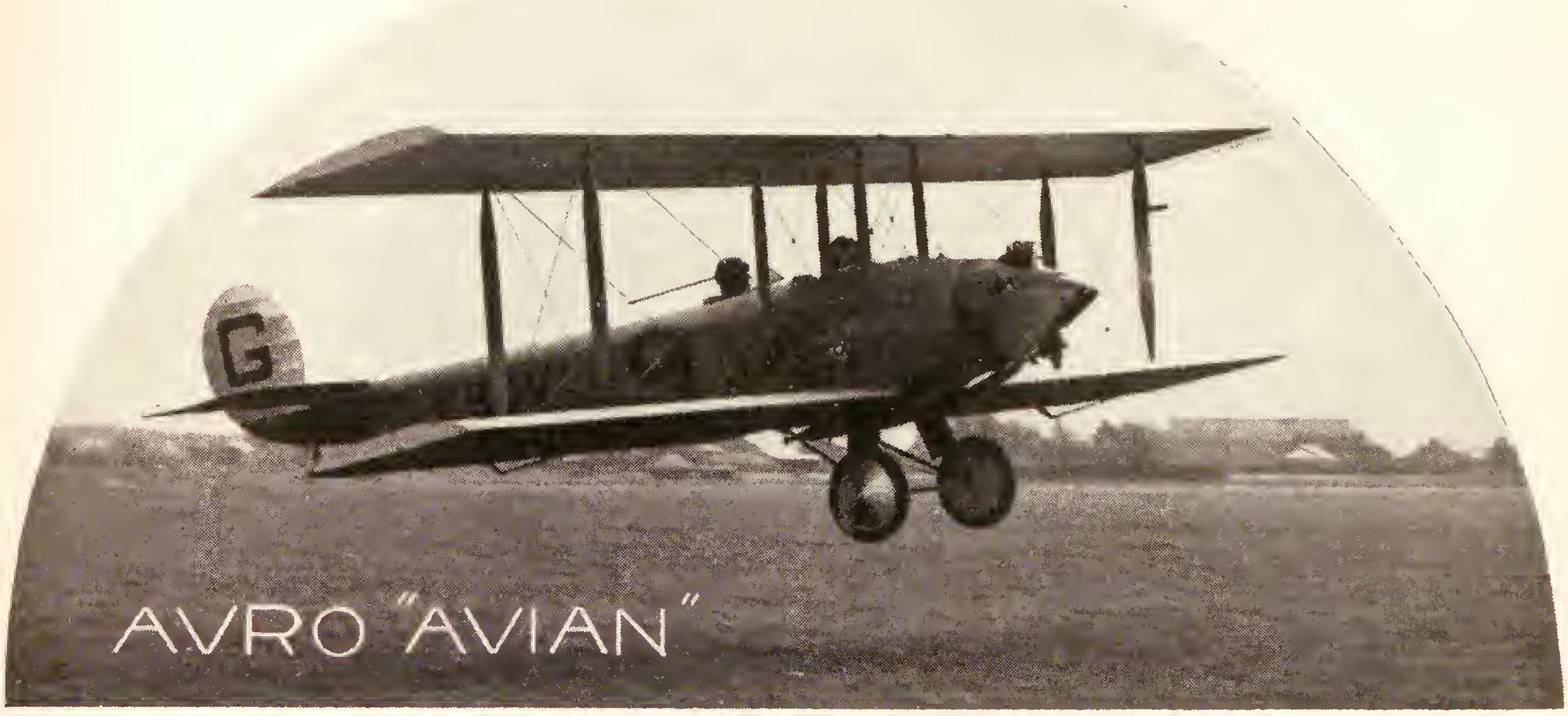
As already mentioned, the "Caffort" engine is of the horizontally opposed type. Each bank of cylinders lies horizontal, and the overall depth of the engine is very small indeed. Thus, even when used in the ordinary way in the nose of a fuselage, the engine would give a particularly good view over the top from the pilot's cockpit, and for this reason alone the type might be worth developing, quite apart from its obvious suitability for mounting in the interior of a thick wing.

The cylinders are water-jacketed in the normal way, and the overhead valve gear is entirely enclosed in casings. It was pointed out that these casings could, in future engines, very easily be lightened since they do not have to take any stresses and in this way alone it is thought that about 100 lb. could be saved in the weight.

The crankshaft has three pairs of crankpins each pair being placed at an angle of 120° in relation to adjacent ones. Opposite cylinders have one connecting rod taking its big end bearing direct on the crankpin, its "opposite number" having an articulated connecting rod. The crank-



ENGINES AT THE PARIS SHOW : Two Farman "broad-arrow" types, on the left the 500 h.p. and on the right the 700 h.p.



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THE AVRO "AVIAN" two-seater light Aeroplane was the only newly designed machine at Lympne, and it has been universally acknowledged that it was the most interesting aeroplane present. "The Aeroplane" said :

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THIS extraordinary weight-carrying capacity of the competition machine not only serves to indicate once more the superiority of Avro design, but makes it possible to secure by modification all the essential qualities of the privately-owned aeroplane, and, moreover, those refinements which help so much towards the comfort of aerial travel, without fear of overloading.

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Sir Alan Cobham, in a message to "Flight."

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shaft, incidentally, is in three pieces. There are four valves per cylinder, the inlet valves being underneath and the exhaust valves on top. Four carburettors are fitted, one at each "corner" so to speak, each carburettor supplying three cylinders.

The engine can be used either as a direct drive, or as a geared-down engine, the same front cover being used in either case, and the transformation from geared to direct drive being carried out merely by removing two spurs from the front of the crankshaft. When geared the ratio of engine speed to propeller speed is in the order of 2,000 to 1,060 r.p.m. The engine can be used either as a tractor or as a pusher.

The main data relating to the "Caffort" engine are as follows: bore, 145 mm.; stroke, 150 mm.; cubic capacity, 29·742 litres; volumetric compression pressure (cold), 5·3 kgs.; normal speed, 2,000 r.p.m.; normal propeller speed, 1,060 r.p.m.; power, 500 b.h.p. at 2,000 r.p.m.; petrol consumption, 250 gr. per horse-power/pr. hour; oil, 20 gr./h.p./hr.; weight of engine, 600 kg.

It is believed that the power will later be increased to 600 h.p., while the weight can be considerably reduced. In this first experimental engine no attempt has been made to cut the weight down.

THE FARMAN ENGINES

In view of the fact that but few changes have been made in the Farman engines since the last Paris Aero Show in 1924, and that such alterations as are found are for the most part minor ones dictated by considerations connected with the manufacture of the engines, there is little need for a detailed description here. On the Farman engine stand are exhibited one of the 500/550 h.p. broad arrow type 12 WE engines and one 700 h.p. engine, also of the broad arrow type (the 18 cylinder 18 WD), and a partly stripped 500 h.p. type which, a placard announces, has flown, in a Farman F.170 machine, 50,000 km. in 300 hours, officially controlled by the S.N.Ae.

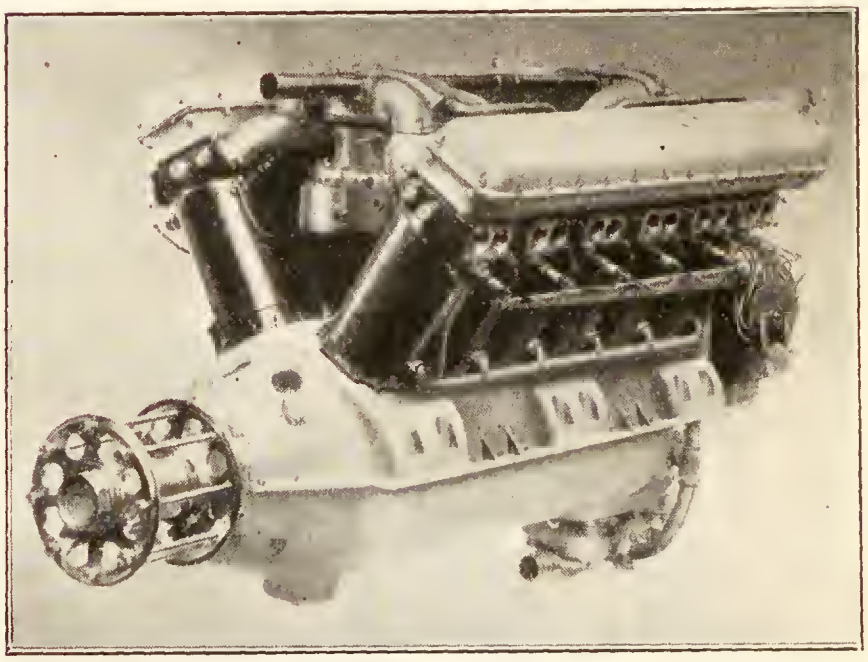
The Farman 500 h.p. engine has annexed, in one year, no less than 14 world's records, including altitude with useful load of 2,000 to 6,000 kg., duration without landing 45 hours 12 mins., and distance without landing 4,400 km.

The Farman type 12 WE has the following characteristics: Bore, 130 mm.; stroke, 160 mm. Compression ratio, 5·5 to 1 or 6·5 to 1. Nominal power, 500 h.p. at 2,130 r.p.m.; maximum power of low compression type 540 h.p. at 2,200 r.p.m. The geared type can be supplied with two different ratios. 2 to 1 and 1·53 to 1. Petrol consumption 230 gr. per h.p. per hour. Oil 10 gr. per h.p. per hour. Weight of direct drive engine, 470 kg.

The 700 h.p. type 18 WD engine is similar to that shown at the previous Paris Aero Show, but the power has been increased from 600 h.p. to 700 h.p. by increasing the speed from 1,750 r.p.m. to 1,850 r.p.m., and by other minor improvements. It has a bore of 130 mm. and a stroke of 180 mm. Like the smaller engine, it is supplied with two compression ratios: 5·5 or 6·5 to 1. The nominal power of 700 h.p. is developed at a speed of 1,850 r.p.m., while a maximum power of 820 h.p. is developed at 1,920 r.p.m. The geared-down type can be supplied with two different ratios: 2 to 1 and 1·53 to 1, as in the case of the smaller engine. The petrol consumption is 230 gr./h.p./hr., and the oil consumption 10 gr./h.p./h. The direct drive engine weighs 725 kgs.

THE FIAT ENGINES

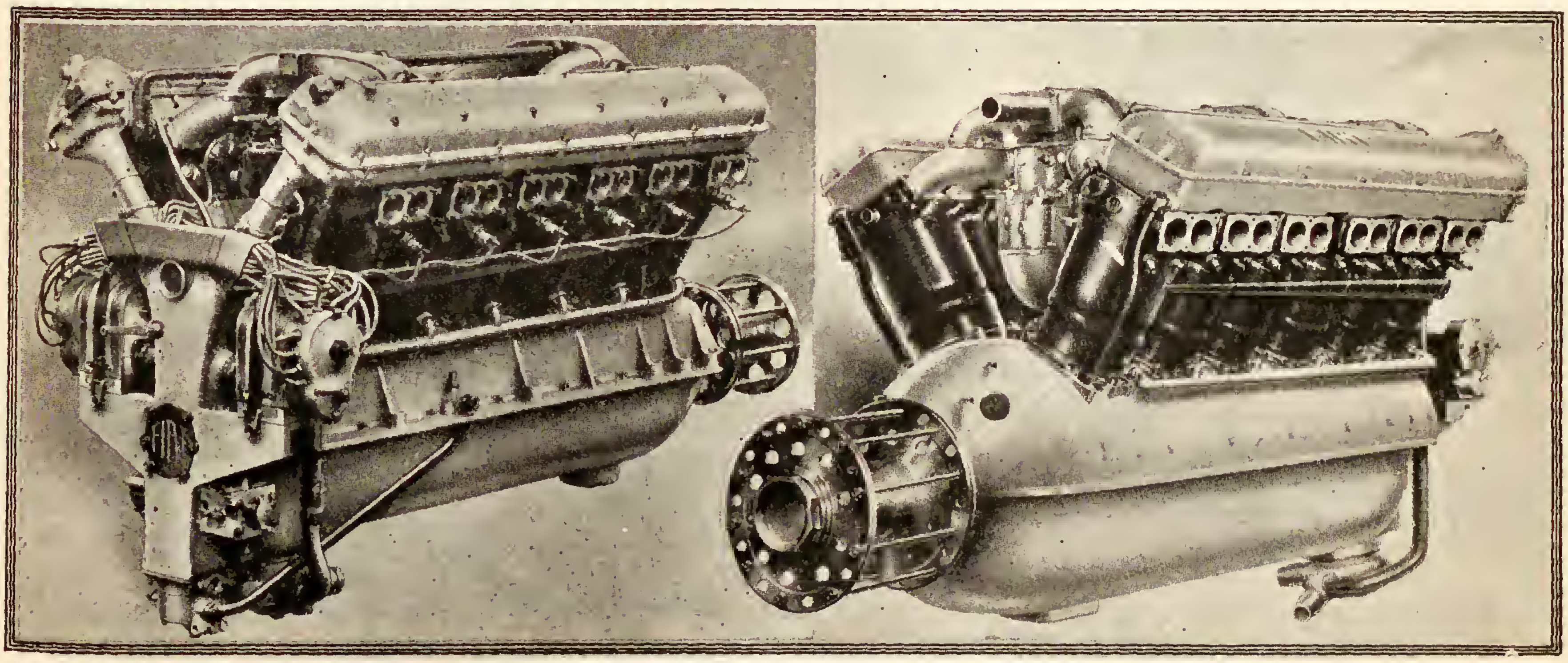
It had been hoped that the Paris Aero Show would have afforded an opportunity of examining the Fiat engine fitted in the Macchi monoplane on which Commandant de Bernardi won the Schneider Cup seaplane race at an average speed of 396·6 km./h., and on which he later established a world's record for seaplanes by flying over the measured straight line course at an average speed of 416·605 km./h. Unfortunately, however, this engine is not exhibited, and so visitors to the Grand Palais have to be content with an examination of the A.20, A.22, and A.25 engines exhibited on the Fiat stand. All three are generally similar, are of the water-cooled 12 cylinder Vee type, and are very "clean," much of the neat appearance doubtless being due to the placing of the carburettors between the cylinder banks.



ENGINES AT THE PARIS SHOW: The Fiat A.20, 410 h.p. model.

The Fiat A.20 has a bore of 115 mm. and a stroke of 150 mm. The cubic capacity is 18·7 litres, and the engine develops a normal power of 410 h.p. at 2,060 r.p.m., and a maximum of 455 h.p. at 2,400 r.p.m. The weight dry is 336 kg., and with water 346 kg.

The A.22 is a slightly more powerful engine of the following



ENGINES AT THE PARIS SHOW: The Fiat A-22 model, a 12-cylinder "V" of 550 h.p. and the A-25, 900 h.p.

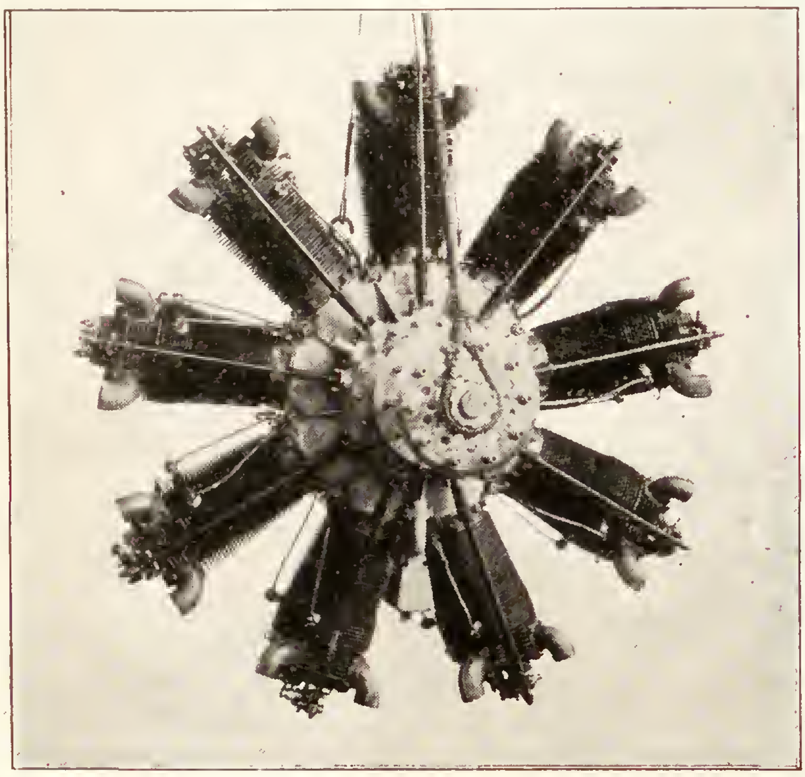
characteristics: Bore, 135 mm., stroke, 160 mm.; cubic capacity, 27·9 litres; normal power, 550 h.p. at 1,900 r.p.m.; maximum power, 590 h.p. at 2,100 r.p.m.; weight, dry, 444 kg.; weight with water, 460 kg.

The large A.25 type has a bore of 170 mm., a stroke of 200 mm. and a cubic capacity of 54·5 litres. Its normal power is 900 h.p. at 1,750 r.p.m., and maximum power 980 h.p. at 2,000 r.p.m. The weight of the engine dry is 812 kg., and with water 849 kg.

Although the Schneider Cup engine, the type AS is not exhibited, and in spite of the fact that it was illustrated in Flight recently, it is thought that a brief specification of it may be of interest here:—No. of cylinders, 12 (60°). Bore, 140 mm. Stroke, 170 mm. Cubic capacity, 31·4 litres. Compression ratio, 6 to 1. Power, 882 h.p. at 2,500 r.p.m. Weight of engine, 412 kg.

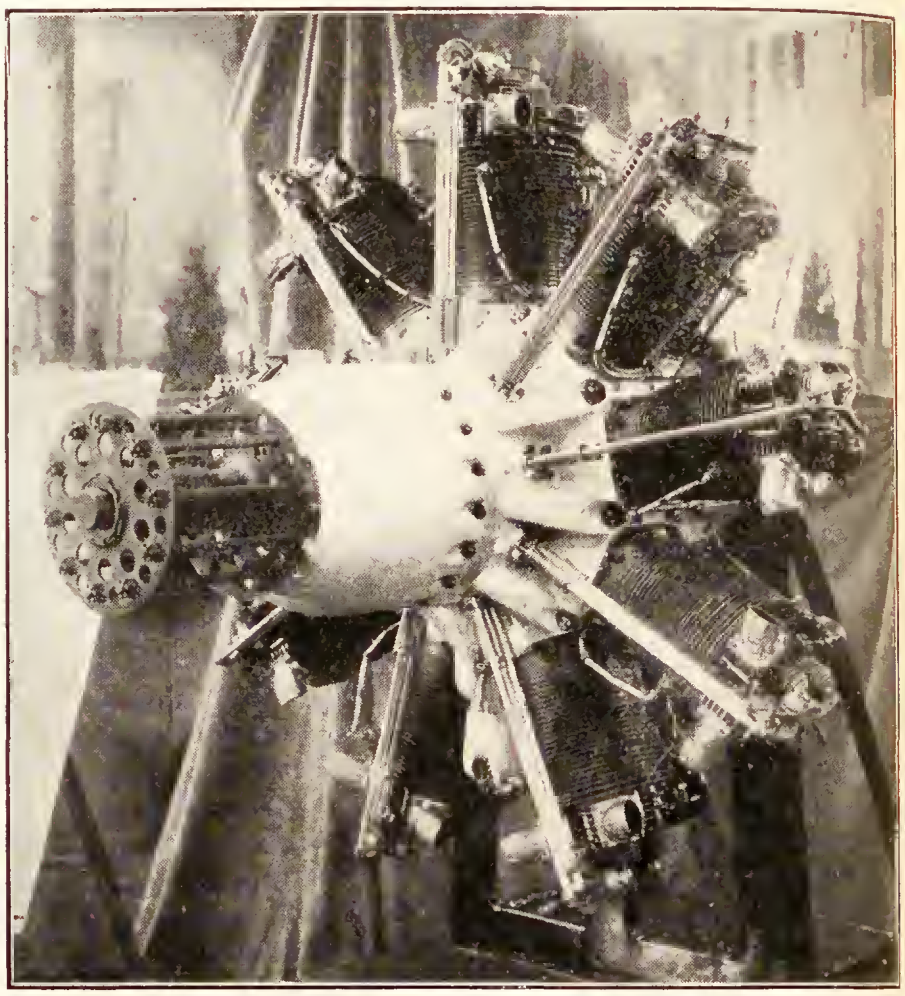
GNOME & RHONE

On this stand are found four engines, one 80 h.p. le Rhone rotary, one 120 h.p. le Rhone rotary, a standard Gnome-Rhone 420 h.p. "Jupiter," and a new geared-down Gnome-Rhone "Jupiter." The two rotary engines are of no great interest to readers of Flight nowadays. The "Jupiter" is the standard type, as supplied in very great numbers to the French and foreign Governments, and is practically identical with the British engine. The main interest, therefore, centres in the geared-down "Jupiter," but unfortunately we have been unable to obtain any detailed information concerning this engine. The engine itself appears to be practically standard, except, of course, for such small modifications to the front of the crankcase as have been rendered necessary by the addition of the reduction gear, which is enclosed in a cylindrical casing on the front of the crankcase.



ENGINES AT THE PARIS SHOW: The French-built Gnome-Rhone "Jupiter."

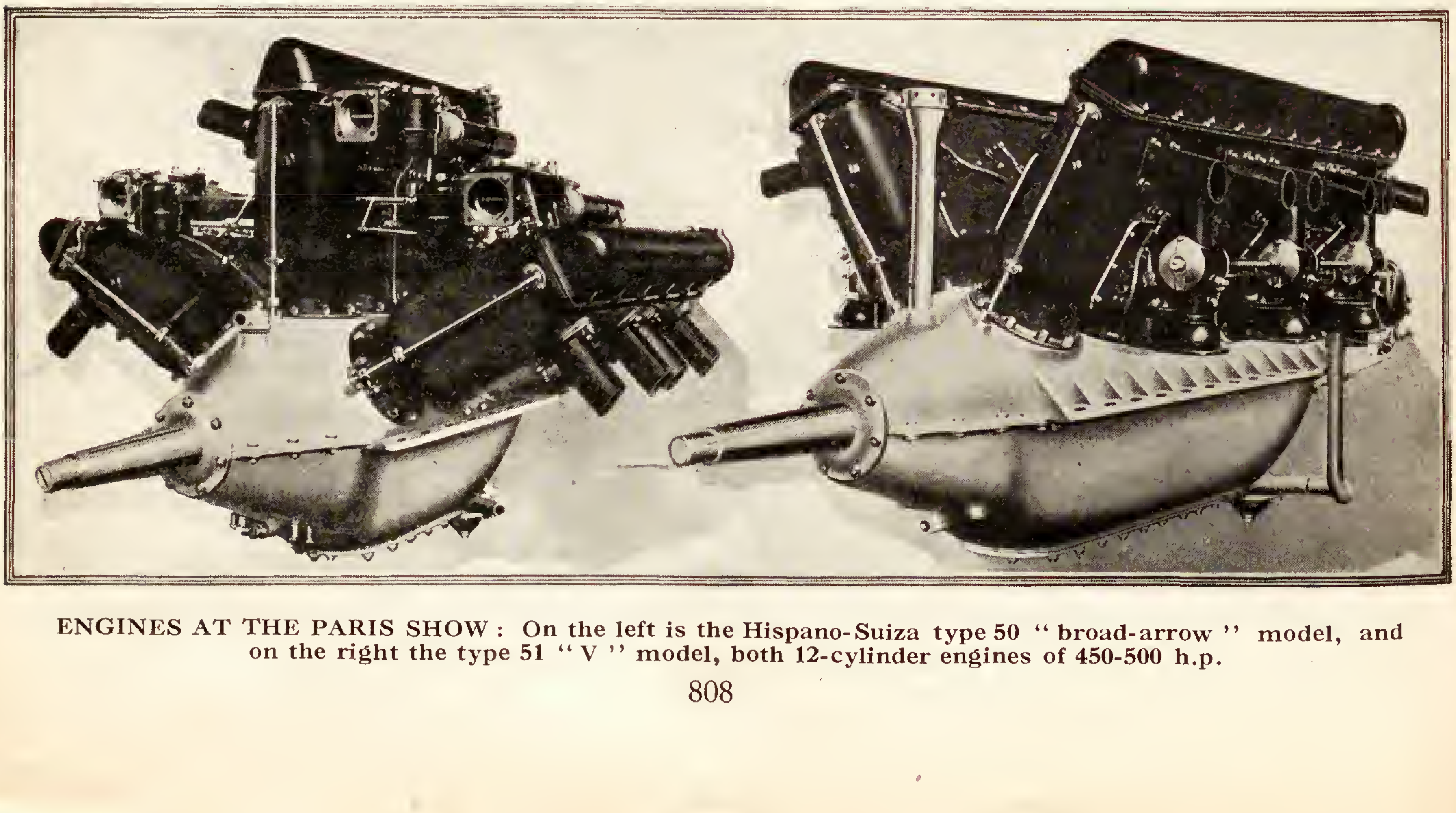
The direct-drive Gnome-Rhone "Jupiter" is supplied with three different compression ratios: 5 : 1, 5·3 : 1, and 6·57 : 1, the types being known as the 9 Aa, 9 Ab, and 9 Ac. In all cases the bore is 146 mm. and the stroke 190 mm., giving a total swept volume of 28·628 litres. The nominal power of the low-compression type is 380 h.p. at 1,575 r.p.m. That of the 9 Ab is 420 h.p. at 1,700 r.p.m., and of the 9 Ac 420 at 1,750 r.p.m., all at ground level. The petrol consumption, in grammes per h.p. per hour, for the three types is 235, 230 and 224 respectively, while the oil consumption is 17, 18 and 20 gr. respectively. The weight of the engine is 335 kg. in all three types.



ENGINES AT THE PARIS SHOW: The 480-600 h.p. Gnome-Rhone "Jupiter" with half-reduction gear.

HISPANO-SUIZA

The Hispano-Suiza firm this year appears to have concentrated on the two 450-500 h.p. types, the 12-cylinder Vee and the



ENGINES AT THE PARIS SHOW: On the left is the Hispano-Suiza type 50 "broad-arrow" model, and on the right the type 51 "V" model, both 12-cylinder engines of 450-500 h.p.

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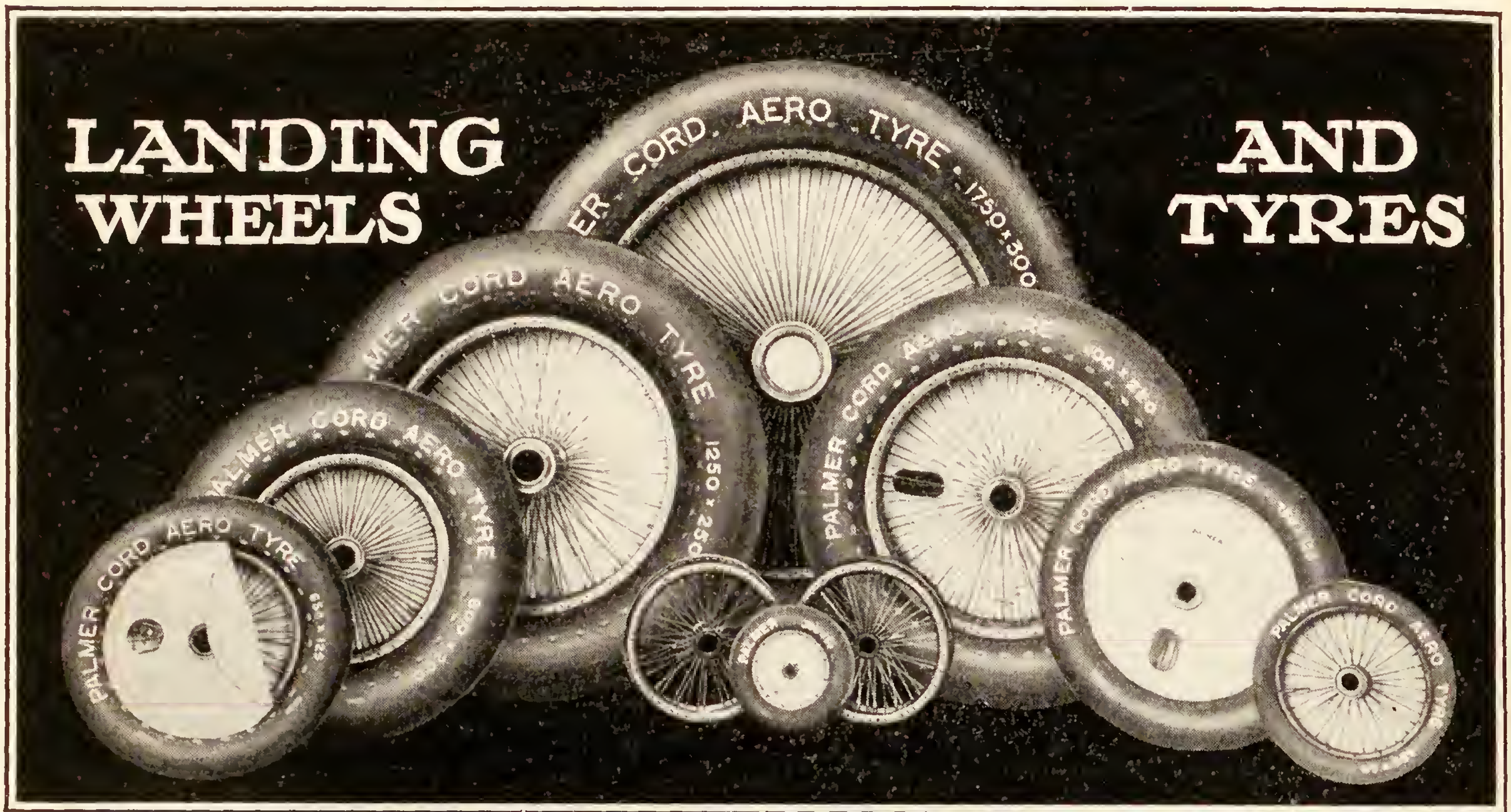

STANDARD SIZES.

Tyre Size	Wheel No.	Hub		Track Line
		Length	Bore	
		m/m.	m/m	m/m
375 × 55	168	111.12	25.4	Central
300 × 60	16	111.12	25.4	Central
450 × 60	30	89.	31.75	Central
,,	172	130.	38.09	Central
575 × 60	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
650 × 65	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
600 × 75	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
700 × 75	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
700 × 100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46
700 × 100	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
650 × 125	119	178.	55.	132/46
,,	147	178.	55.	Central
,,	188	120.	34.92	Central
750 × 125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
800 × 150	161*	185.	55.	135/50
,,	162*	185.	55.	Central
,,	163*	185.	66.67	135/50
,,	169†	185.	55.	135/50
,,	177	185.	55.	135/50
,,	183	185.	55.	Central
,,	211*	185.	60.32	135/50
1000 × 150	167	185.	55.	125/60
,,	174	250.	80.	Central
,,	182	185.	55.	Central
1000 × 150	187	220.	66.67	Central
,,	201	185.	60.32	125/60
,,	210	185.	60.32	Central
1000 × 180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
,,	166	185.	55.	125/60
900 × 200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	157	185.	80.	Central
,,	202	185.	60.32	Central
1100 × 220	134	220.	66.67	Central
,,	136	250.	80.	Central
975 × 225	192	185.	60.32	Central
,,	194	185.	55.	125/60
1250 × 250	133	250.	80.	Central
,,	154	304.8	101.6	Central
1500 × 300	115	304.8	101.6	Central
,,	126	304.8	152.4	Central
1750 × 300	139	400.	152.4	Central
,,	191	350.	150.3	Central
1750 × 350	193	400.	125.	Central

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D/ND

(365)

12-cylinder "broad arrow." The former, known as the type 51, has a number of notable performances to its credit, such as, to quote from a placard displayed on the stand, the flight from Paris to Calcutta and back to Paris in 14 days, a distance of 20,000 km., and a total "mileage" of 80,000 km. (or twice around the world) without incident, flown in various flights. It was also this engine which was fitted in the world's record non-stop flight from Paris to Djask (in Persia), a distance of 5,450 km. So far, perhaps, the most meritorious performance of the broad-arrow type, 50, is the world's speed record in the Bernard-Ferbois piloted by Adjutant Bonnet (448·170 km./h.) in 1924, which has not yet been beaten. Both engines are well known, so that the following brief specifications will suffice :—

Hispano-Suiza type 51 : 12 cylinders at an angle of 60°. Water cooled. Bore, 140 mm. ; stroke, 150 mm. Compression ratio, 5·3 to 1. Power, 500 h.p., at 1,800 r.p.m. ; maximum power, 520 h.p. at 1,900 r.p.m. ; weight, dry, 420 kg.

Hispano-Suiza type 50 : 12 cylinder broad arrow type, water cooled. Bore, 140 mm. ; stroke, 150 mm. ; compression ratio, 5·3 to 1 ; power, 450 h.p. at 1,725 r.p.m. ; maximum power, 487 h.p. at 1,800 r.p.m.

ISOTTA-FRASCHINI

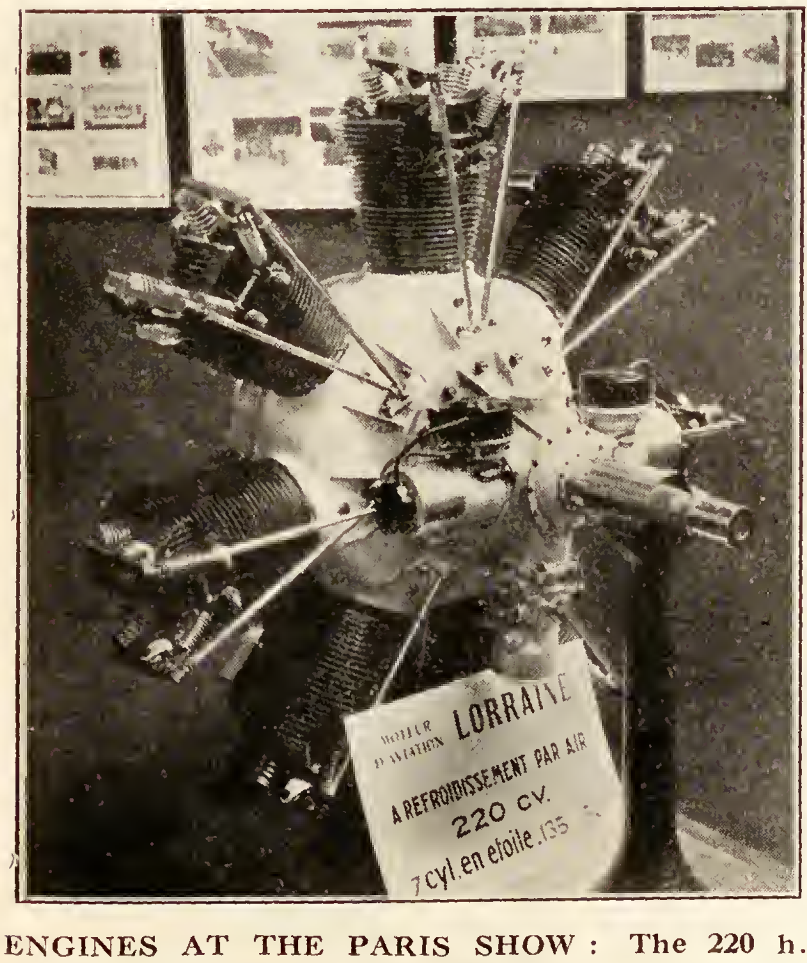
THE Isotta-Fraschini company are showing five engines, of which two are old war types, and thus of no particular interest These are the V6 and V4B vertical six-cylinder water-cooled types. The remaining three are : One V4B shown sectioned ; one V6, also shown sectioned ; and the modern "Asso" type, a 500-550 h.p. 12-cylinder Vee water cooled.

The main characteristics of the "Asso" are : Bore, 140 mm. ; stroke, 150 mm. ; compression ratio, 5·3 to 1 ; normal speed, 1,800 r.p.m. ; weight dry, 420 kg. ; weight with oil and water, 450 kg.

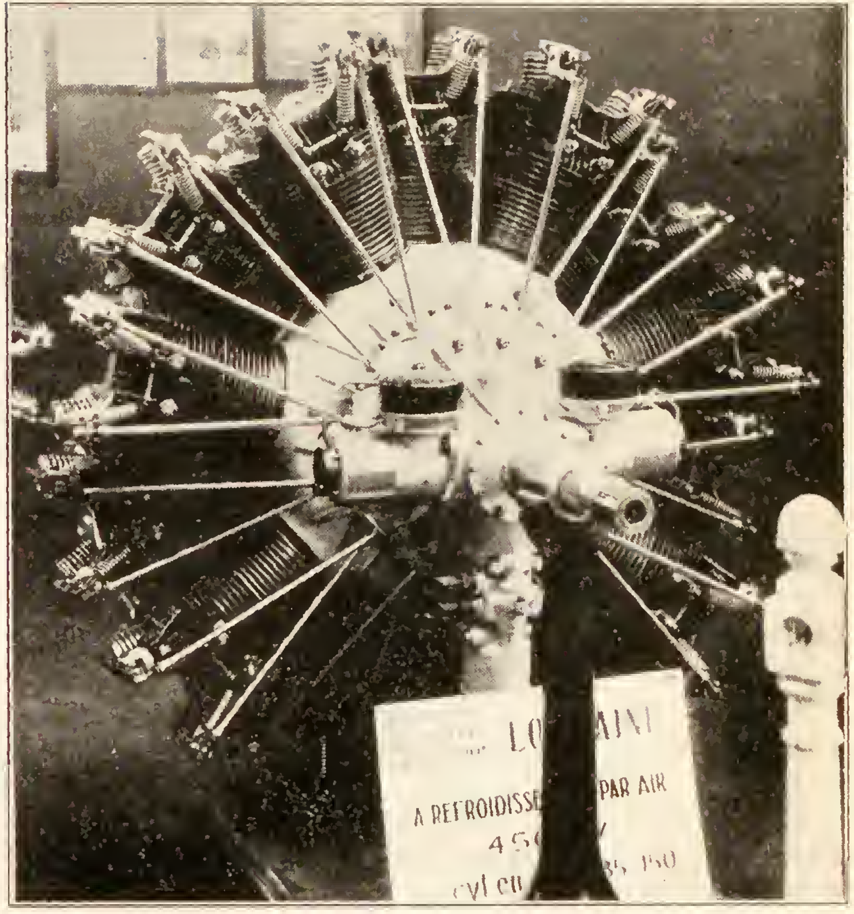
LORRAINE-DIETRICH

THIS old and well-known firm has an imposing display of engines on their stand. The majority, however, are of well-known type, have been exhibited before, and some of them at any rate have provided the power for some famous flights. The exhibits on this stand include the following types :—a 700/800 h.p. 12 cyl. Vee ; a 650 h.p. 18-cyl. broad arrow ; a 400 h.p. 12 cyl. Vee ; a 650 h.p. 18 cyl. broad arrow geared ; a 500 h.p. 12 cyl. broad arrow ; a 450 h.p. 12 cyl. broad arrow geared, and a 450 h.p. 12 cyl. broad arrow built under licence in Spain.

Space does not permit us to give specifications of all the Lorraine-Dietrich engines, but of the water-cooled types perhaps the 700 h.p. is the most interesting. This engine is of typical Lorraine-Dietrich design as regards its general lay-out, and has the following characteristics :—Vee type (60°) water cooled. Bore, 175 mm. ; stroke, 225 mm. Cubic capacity, 65 litres. Nominal power, 700 h.p. at 1,200 r.p.m. Petrol consumption, 240 gr./h.p./h. ; oil consumption, 19 kg. per hour. Weight, dry, 850 kg.



ENGINES AT THE PARIS SHOW : The 220 h.p. 7-cylinder Lorraine air-cooled radial.



ENGINES AT THE PARIS SHOW : The 450 h.p. 14-cylinder Lorraine air-cooled radial.

In addition to their many water-cooled types, the Lorraine-Dietrich firm exhibit two air-cooled types, these being the first air-cooled engines to be produced by the firm. The two engines are radial static engines, the smaller of the two being a 7-cylinder engine of a nominal 220 h.p., while the larger is a 14-cylinder radial with the cylinders arranged in two rows. This engine is rated at 450 h.p. The two air-cooled engines show quite a strong family resemblance with the Armstrong-Siddeley engines, although the overhead valve mechanism differs very considerably from that of the "Jaguar" and "Lynx" engines. These two engines must, we think, have been produced as a result of an amicable arrangement between the two firms, whereby Armstrong-Siddeley's experience has been placed at the disposal of the French firm.

But few particulars of these two engines are available, but following are the main data :—*Type* 47, 7-cyl. radial air cooled. Bore, 135 mm. ; stroke, 150 mm. Cubic capacity, 15·02 litres. Power 200 h.p. at 1,650 r.p.m. ; 220 h.p. at 1,800 r.p.m. Weight, 260 kg.

Type 42.—14-cyl. radial air cooled. Bore, 135 mm. ; stroke, 159 mm. Cubic capacity, 30·05 litres. Power, 450 h.p. at 1,800 r.p.m. Weight of engine, 400 kg.

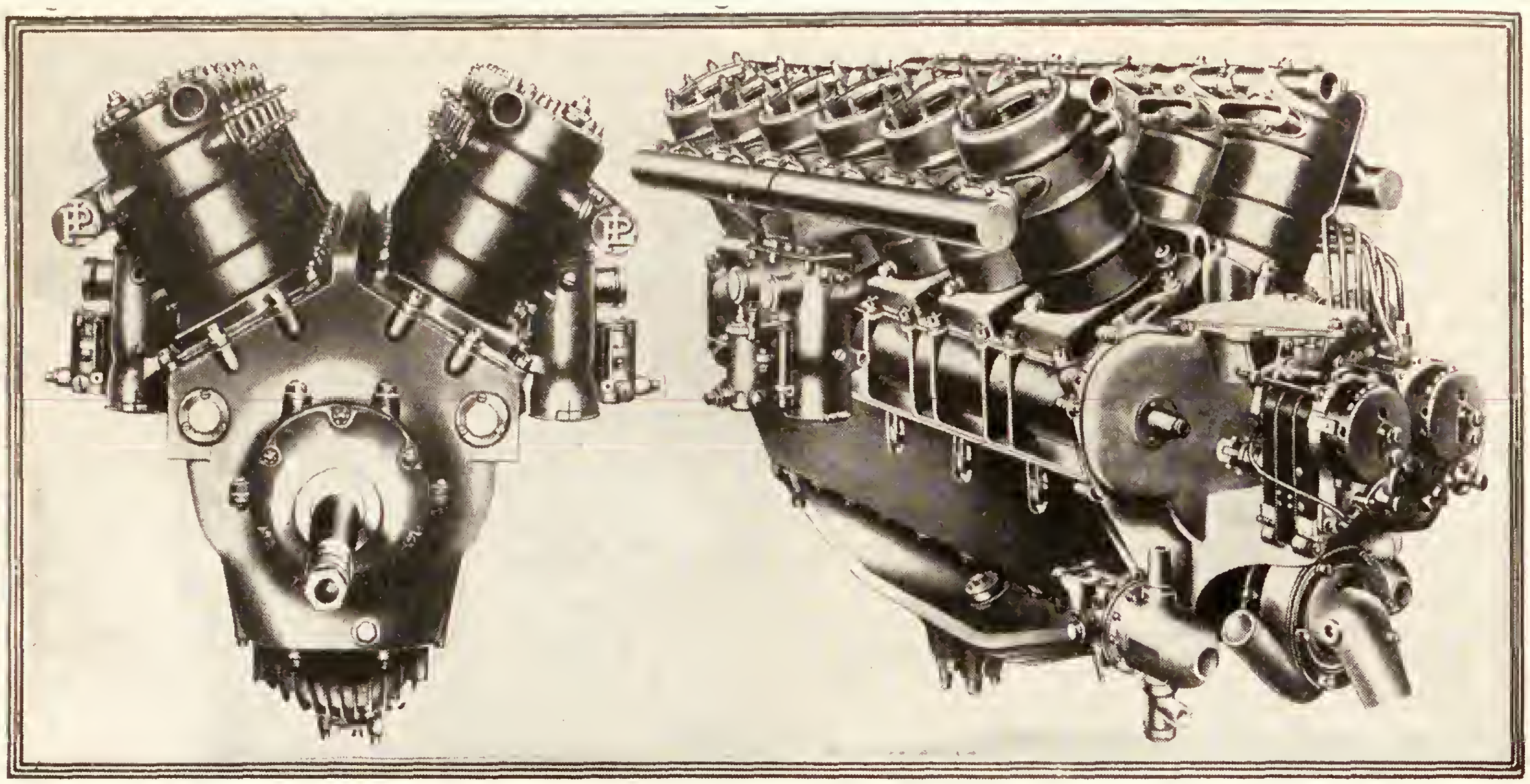
PANHARD-LEVASSOR

THIS firm has concentrated, at this year's Salon, on the sleeve-valve engine, called "sans soupapes" (valveless), of which two large engines are exhibited. Some smaller models illustrate the principle of operation of the sleeve valves, while a normal 12-cylinder Vee water-cooled engine is also shown.

The "Sans Soupapes" engine, type VK 122, has the following characteristics :—12-cylinder Vee type, 60° Bore, 140 mm. ; stroke, 170 mm. Cubic capacity, 31·5 litres. Compression ratio, 5·4 to 1. Power at 1,500 r.p.m., 450 h.p. Power at 1,800 r.p.m., 525 h.p. Weight of engine, 545 kg.

The standard engine, type V 12M, has a bore of 165 mm. and a stroke of 170 mm. The compression ratio is 6 to 1, and the power at 1,550 r.p.m. is 500 h.p. The total weight is 590 kg.

It may be recollected that in the great aero engine competition held by the French Government some time ago, a Panhard-Levassor "Sans Soupapes" engine secured second place in the general classification, while from the point of view of fuel consumption it was the most economical of those

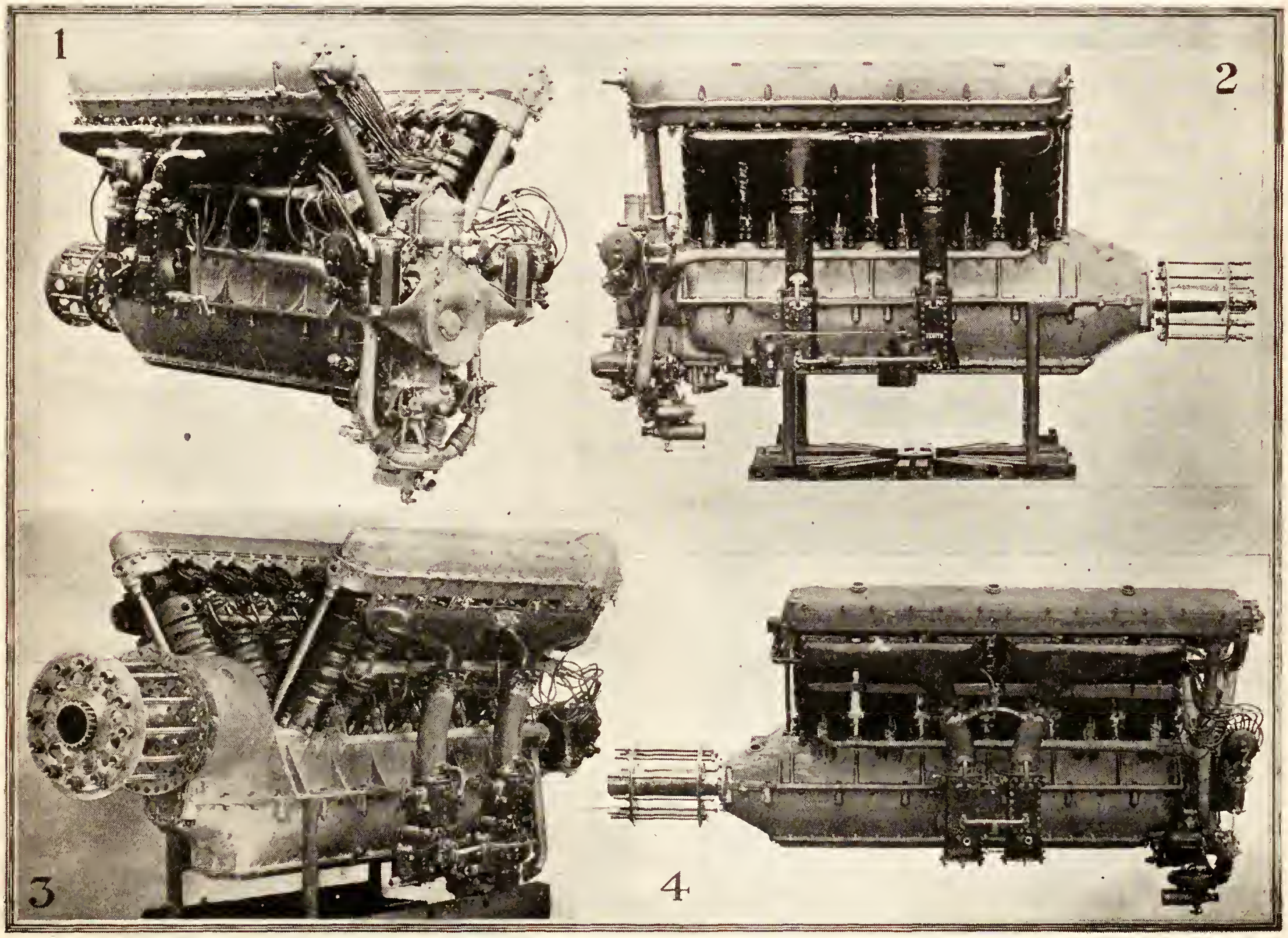


ENGINES AT THE PARIS SHOW: Two views of the 500 h.p. Panhard sleeve-valve engine.

which took part in the competition. In this connection, perhaps, we may quote from a speech made by M. R. Soreau, the distinguished president of the aviation commission of the Aero Club of France, at a banquet shortly after the completion of the competition. "Concerning the Panhard engine," M. Soreau stated, the weight per horse power was 1·260 kg. The consumption, of 243 gr./h.p./h. only, was the best in the competition. If three attempts were annulled, there was, on the other hand, not a single stoppage in the course of the 30 tests in which the engine qualified. The fact should be emphasised that none of the incidents that happened to this valveless engine were attributable to the distribution system. This engine, which secures second place in the two classifications, is remarkable for its regularity, its low consumption, its small size. It represents a prototype of the future."

SOCIETE RENAULT

A most imposing stand is that of the Renault firm. On one side is a vast array of marine engines, stationary engine units, etc., while the other is devoted to aero engines. Among the



ENGINES AT THE PARIS SHOW: Four of the Renault engines. (1) The 450 h.p. direct drive. (2) The 550 h.p. direct drive. (3) The 600 h.p. geared. (4) The 700 h.p. direct. All are water-cooled "V" engines.

BRITISH AERO-ENGINE & ACCESSORIES SECTION OF 'FLIGHT'

In last week's issue of FLIGHT a section was devoted to British Aircraft Constructors, in which particulars were given, more or less condensed, of the work carried out and the types of machines manufactured by each firm. This, we think, provided a useful general all-round guide to the British Aircraft Industry, in so far as the complete machines were concerned; but of paramount importance is the "motive" and "minor" side of the Industry—that appertaining to the engines, accessories and other items necessary in the making and operating of aircraft.

In the following pages, therefore, our readers will find a similar résumé of the activities of British firms in this direction. First we deal with engines, a branch of the British industry that has achieved a world-wide reputation, second to no other country, for reliability and workmanship. The British aero engine, of one make or another, is finding increasing favour abroad, and numerous foreign aircraft constructors are fitting British engines in the machines they produce, whilst in some cases the engine itself is being built, under licence, in that particular country.

Following the engines our readers will find particulars relating to the more important "accessories" for aircraft, such as the very necessary fuel, and some of the fittings required in the petrol system; "Dope" for the wings and other fabric-covered parts of an aeroplane; landing wheels and tyres; wireless for aircraft—perhaps one of the most important components (for it is becoming more than an accessory) employed very largely now, on aircraft; armament for aircraft; and various aircraft instruments, including the aerial camera, which belongs to a branch of aviation, *i.e.*, aerial survey, etc., that is growing more and more important every day.

Finally, we give a few brief particulars of the "Autogiro." True, the "Autogiro" is neither an aero-engine nor an accessory—but there are some who would suggest it is *not* an aeroplane either! So perhaps it may not be necessary for us to put forward our excuse—that the material did not reach us in time—for not including the "Autogiro" in last week's Aircraft Section.

* * *

"FLIGHT" AT THE PARIS AERO SHOW.

FLIGHT is on Sale at the Grand Palais during the French Aero Exhibition and at chief places in Paris. FLIGHT stand is in the gallery, at the Champs-Elysees end of the building, and visitors wishing to leave messages relating to Editorial or Advertising matters should hand them to the Attendant.

FLIGHT may also be obtained from the following:—Messageries Hachette, Messrs. W. H. Smith and Son's, 248, Rue de Rivoli, and at all important News Kiosks in Paris.

A.D.C. AIRCRAFT Ltd.

TWO SUCCESSFUL AERO ENGINES

Formed originally shortly after the Armistice—and known then as the Aircraft Disposal Co.—for the purpose of handling the very large stocks of Government surplus aircraft, aero engines, and accessories, A.D.C. Aircraft have now joined the ranks of British aero engine constructors. Their first effort in this direction was the 120-140 h.p. "Airdisco," an 8-cylinder V air-cooled engine which, fitted in such machines as the Avro type 504 and D.H. 51 has given very satisfactory results.

Two other engines were then produced by A.D.C. Aircraft, which have obtained a very satisfactory position in the ranks of British aero engines—the A.D.C. "Cirrus" and the A.D.C. "Nimbus," some brief particulars of which follow :—

THE A.D.C. "CIRRUS."

The A.D.C. "Cirrus" aero engine—of which there are two models, the Mark I and the Mark II—was designed to meet the requirements of the Light Aeroplane Constructor for a reliable power unit of low horse power at a moderate price.

From the view of the private owner, it was essential that the engine should be free from complicated mechanism, and should be easily accessible for adjustments.

No undue sacrifice has been made to obtain extreme lightness, and to achieve the desired result it was necessary to adopt a progressive and original design, differing from the light engines already available, and this necessitated considerable experiment and research.

As a result, the "Cirrus" engine was produced, and shortly afterwards successfully passed the Air Ministry 100 hours Type Test—incidentally being the first British low-powered aero engine to achieve this distinction.

In its simplicity the engine ranks with the average motor-car engine, and no specialised knowledge of aero engines is necessary to operate or maintain same.

It is a 4-cyl. in line air-cooled engine, with a bore of 105 mm. (Mark I) or 110 mm. (Mark II) and a stroke of 130 mm., the Mark I developing 60 h.p. (normal) at 1800 r.p m. and the Mark II 75 h.p. at same r.p.m. ; the maximum horse power, at 2,000 r.p.m., is in each case 65 h.p. and 80 h.p. respectively. Constructionally, the Mark I and Mark II engines differ only in details, so that the following remarks apply to both. The cylinders are of cast iron, with detachable heads of aluminium alloy carrying overhead valves. The latter are operated through rockers by push rods, the rockers being supported by brackets cast on the cylinder heads. The valve springs are of the double helical type and are interchangeable. The pistons are of aluminium alloy, fitted with two (Mark I) or three (Mark II) cast-iron rings. The hardened steel gudgeon pin is a floating fit on the piston, and is fixed in the connecting rod by a special stud and nut or circlip.

The connecting rods are of H section, Duralumin stampings in the case of the Mark II, with the big end bearing of white metal in a bronze shell. The crankshaft is carried in five bearings, which differ in the two models as follows :—In Mark I, three inner bearings of white metal in bronze shells, and front and rear bearings of the ball type ; in Mark II these latter bearings are of the roller type. The upper portion of the crank case contains the three central crankshaft bearings, the top half of the end bearing housings, and also the camshaft. The lower portion forms the oil sump and carries the oil pump relief valve and oil strainer, and also forms the lower half of the ball bearing housings.

The camshaft is supported on three plain phosphor-bronze bearings. All cams and bearings on this shaft are case hardened. A spiral gear on the camshaft drives the oil pump. The latter is arranged at the lowest part of the crankcase, so that it is always primed with oil. This pump forces the oil through the gauze filter and thence through oil ways to connecting holes opposite each main bearing, the oil being thus forced under pressure directly to each of these.

The standard engine is provided with 2-4 cylinder B.T.H. magnetos, one being fitted with an impulse starter. Each magneto operates a separate set of plugs, thus providing two independent ignition systems.

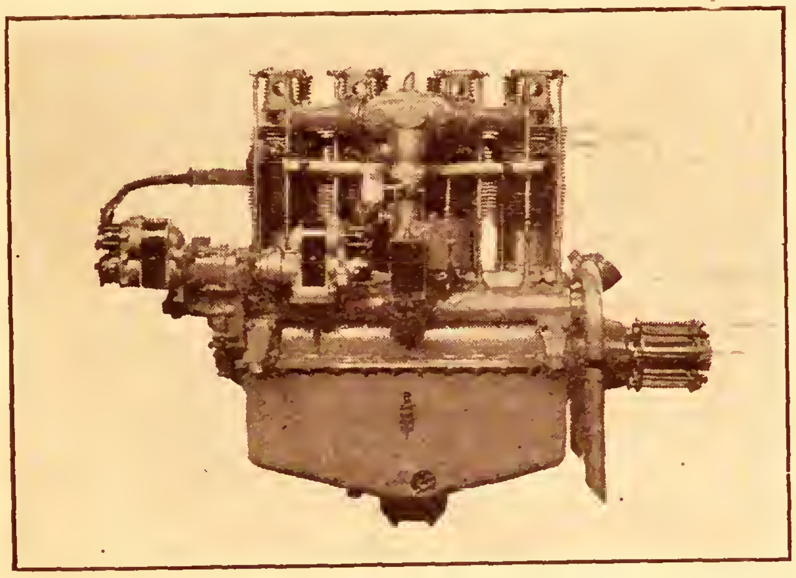
THE A.D.C. "NIMBUS"

This engine, which has passed its Air Ministry Type Tests, was developed, or evolved, from the well-known Siddeley, "Puma" engine, of which engine A.D.C. Aircraft, Ltd., holds large stocks, with spare parts. It is, however, to all intents and purposes really quite a different engine, developing a higher power, although it is designed to fit standard "Puma" bearers and several of the original "Puma" parts, where opportunity presented itself, have been incorporated in its construction. Nevertheless, it is still of the "Puma" family, especially as its designer, Major Halford, was one of those responsible for the design of the "B.H.P." engine, the forerunner of the "Puma."

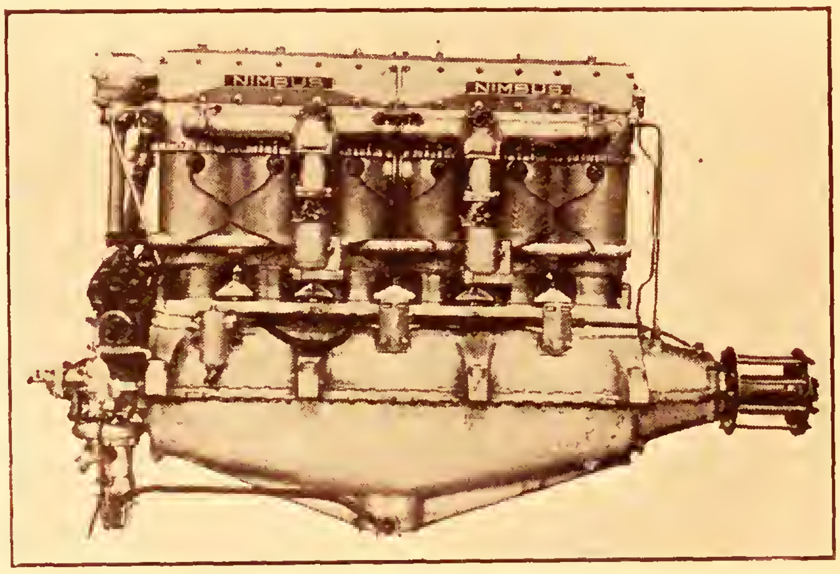
Its construction, however, differs considerably from the "Puma" ; the "Nimbus" is a 6-cylinder inline water-cooled engine, with steel cylinders screwed into the bottom of the water-jacket blocks, and secured at the top to the aluminium alloy cylinder head blocks by the valve seatings which are screwed into the head-blocks. The water-jackets are formed by two aluminium castings, each block enclosing three cylinders and being secured to its respective cylinder head block by a number of bolts.

Each cylinder has one inlet and two exhaust valves, operated by an overhead camshaft—directly in the case of the exhaust and through short rockers for the inlet valves. In fact, the valve gear is much the same as in the "Puma." An entirely new and considerably strengthened crankshaft is, however, fitted in the "Nimbus," whilst aluminium alloy pistons of special design are employed, which, although of larger bore, are lighter than the original. Finally, it may be added, that the outstanding features of the "Nimbus" are :—Lightest engine per h.p. of its type ; exceptionally low petrol consumption ; installation interchangeable with "Puma" ; small frontal area.

Specification.—Bore, 152 mm. ; stroke, 190 mm. ; compression ratio, 5·4 : 1 normal r.p.m., 1,450 ; maximum r.p.m., 1,600 ; normal b.h.p. (at 1,450), 305 ; maximum b.h.p. (at 1,600), 335 ; petrol consumption, at 305 h.p., 0·58 pts. per/h.p./hr. ; oil consumption, 0·017 pts. per/h.p./hr. ; weight, dry, in running order (less radiator and water), 670 lb. ; weight per h.p. (as above), 2 lb. (approx.).



The A.D.C. "Cirrus."



The A.D.C. "Nimbus."

R. M. KINDERMAN
COLLECTION

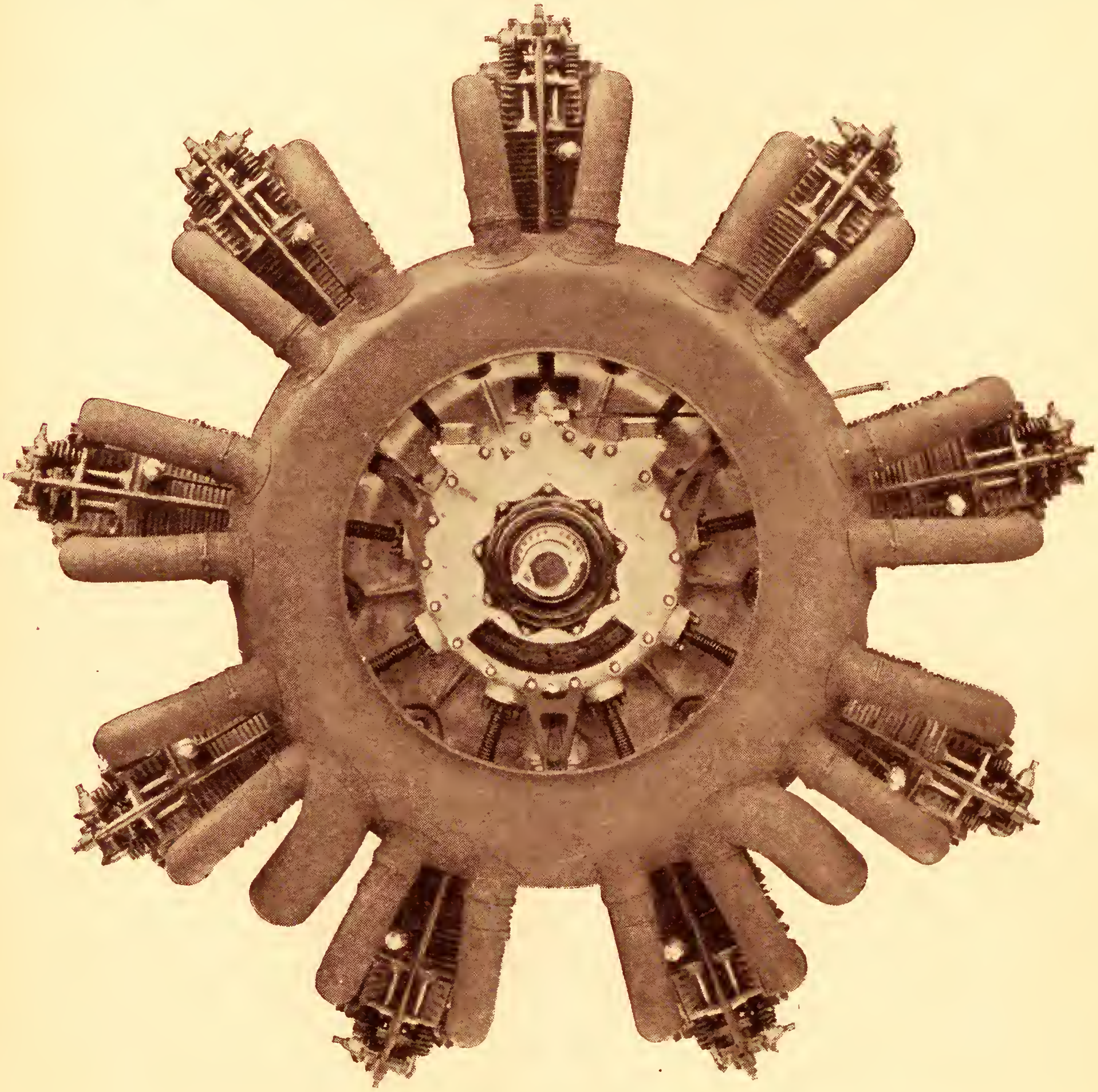
The BRISTOL AEROPLANE Co., Ltd.

Bristol Aircooled Aero Engines

Setting a Standard to the World

The "Bristol" Jupiter radial aircooled aero engine is recognised throughout the world today as the ideal power unit for all types of military and commercial aircraft by reason of its proved high standard of reliability and efficiency. So wide has been the recognition of the qualities of the engine that licences have been granted for its manufacture in France, Italy, Czecho-Slovakia and Japan, and today Jupiter engines are in service in most parts of the world in which flying is undertaken, including Great Britain, France, Poland, Germany, Norway, Sweden, Czecho-Slovakia, Italy, Russia, Roumania, U.S.A., Chile, Japan, Finland, Holland, Latvia, Netherlands, East Indies, etc., in increasing numbers. At the present time probably more machines are being constructed throughout the world to take the Jupiter than for any other type of engine.

The reasons for the supremacy of the Jupiter engine are not hard to seek, for the excellence of the features embodied in its design have been fully proved out in flying service. That the Jupiter is the lightest and simplest engine of its power are points of importance; but more important still is the fact that combined with lightness and simplicity the engine has proved to possess a standard of reliability and efficiency eclipsed by no other power unit. No other aero engine, and indeed, no motor car engine, has ever completed an officially controlled flight of 25,000 miles without a replacement of any kind as has the "Bristol" Jupiter. It is worthy of comment that when this engine was stripped down for inspection after its 225 hours' running the official report stated that the condition was excellent and the engine ready for further service after the replacement of one valve and spring. Since that time, the same engine has completed several notable flights, including a record journey from London to Cairo in 50½ hours.



The "Bristol" Jupiter Series IV.

As the Jupiter engine is aircooled its running is unaffected by variations of climate and temperature. Within the Arctic Circle in Sweden, during the torrid heat of the Mesopotamian summer, and under the warm conditions during the French campaign in Morocco, the Jupiter engine has proved its worth. As a result of the manner in which it demonstrated its high standard of efficiency in Morocco, a report was forwarded to the French Ministries of War and Marine by Marshal Petain, highly eulogising the qualities of the Jupiter engine, and pointing out that it was the type of engine upon which he had been forced to rely for dependable running during the campaign.

Three models of the Jupiter are available, of 6·3 : 1, 5·3 : 1 and 5 : 1 compression. The first of these is especially suitable for use with light single-seater and other military aircraft, normally operating at altitudes of 15,000 ft. or upwards. The commercial engine, as its name implies, has been developed especially for use in commercial machines, the lower rating ensuring longer life between overhauls and satisfactory running under a wide range of conditions and fuels. The standard engine is for machines normally operating at medium altitudes, and requiring medium power at ground level with standard fuels.

The power output of the 6·3 : 1 compression ratio engine at 5,000 ft., with standard fuel, is 425 b.h.p. at 1,700 r.p.m., or 465 b.h.p. at 1,870 r.p.m. At ground level, with extra benzol mixture, the power is 470 b.h.p. at 1,700 r.p.m., and 510 b.h.p. at 1,870 r.p.m. The Standard Service engine, 5·3 : 1 compression, gives 450 b.h.p. at 1,700 r.p.m. at ground level, and 485 b.h.p. at 1,870 r.p.m., whilst the power of the Commercial type engine is 420 b.h.p. at 1,700 r.p.m.

As an aero engine for commercial aircraft, the Jupiter has rapidly attained a leading position. The new three-engined Hercules machines of Imperial Airways, Ltd., for service on the London-Karachi route, are fitted with " Bristol " Jupiter engines, whilst the aircraft belonging to the North Sea Aerial and General Transport Company to fly between Khartoum and East Africa, has also the " Bristol " Jupiter engine as its power unit. Amongst the Continental Air Companies the K.L.M. Air Line have adopted the Jupiter engine as standard in all their machines, whilst many of the important French, Italian, and Portuguese Air Lines are also using Jupiter engines in increasing numbers. Lengthy experience with the Jupiter has proved its very high standard of economy for commercial work. The K.L.M. Air Line, for instance, flew their first engine for 211 hours before it was dismantled for inspection and in their report it was stated that the wear on the principal parts at that stage was practically nil.

Details of the Engine

The nine-cylinder Jupiter engine has a bore of 5·75 in. (146 mm.) and a stroke of 7·5 in. (190 mm.), the total stroke volume being 1,753 cub. in. (28·7 litres). The normal engine speed is 1,700 r.p.m. and the maximum engine speed 1,870 r.p.m. The " Bristol " Triplex carburettor is fitted with two B.T.H. type C.E. 9 magnetos, the weight of the engine being 730 lbs.

The Jupiter engine, although extremely robust, is very compact and convenient for installation, the grouping on the rear cover of the auxiliary drives and accessories, such as magnetos, carburettor, controls, oil pump, oil filters, gas distributor, gun gear and tachometer drive, ensures the necessary protection for these components, whilst allowing of a simple form of cowling, with a detachable rear panel, giving ready access to all components.

The crankcase is in two main portions, and is machined from duralumin stampings. The crankshaft is of the built-up type and manufactured from hardened and tempered 60-ton nickel chrome steel stampings. The master rod and the eight articulated rods are also machined from 65-ton nickel chrome steel stampings. The pistons are of cast aluminium alloy of the slipper type, carrying two gas rings and one oil scraper ring of special design.

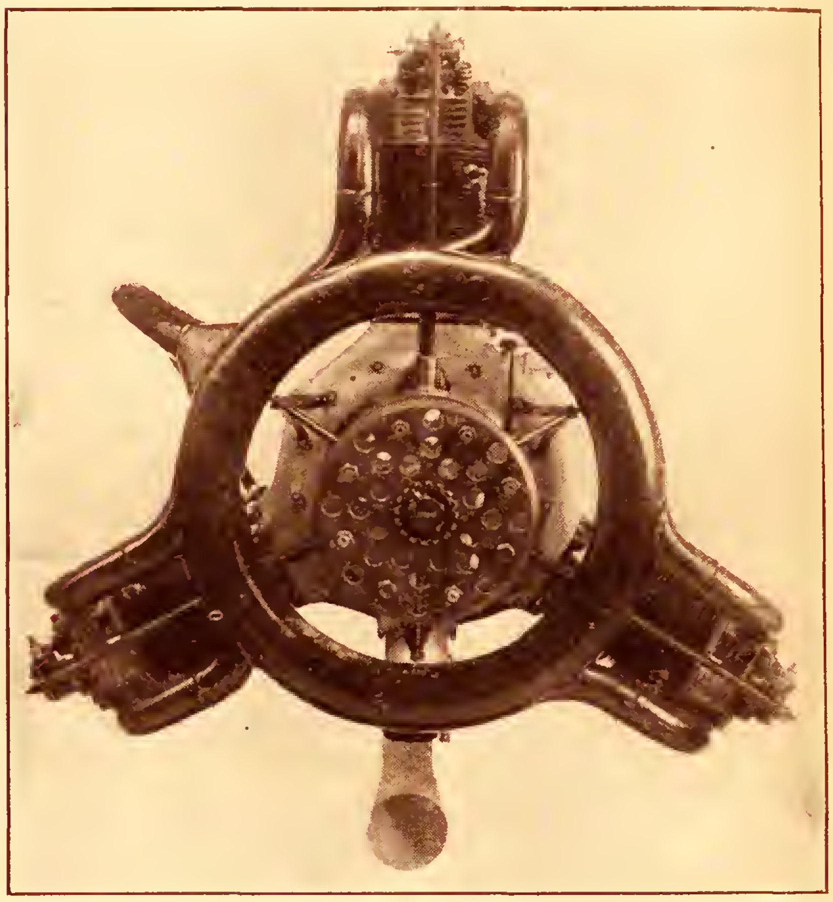
The cylinders are of composite construction ; the barrels, machined from alloy-steel forgings, have an integral combustion head from which the overhead valves, two inlet and two exhaust, are seated direct. The head, which embodies the valve ports and carries the valves, valve guides, and rocker mechanism, is of cast-aluminium alloy of high heat conductivity, and is secured to the steel barrel by studs and set screws, a faced joint being made with the cylinder barrel to ensure the maximum heat conductivity.

The two-row, large-diameter, four-lobed cam runs concentric with the crankshaft front end and is driven from it by eccentric epicyclic gearing at one-eighth engine speed in an anti-crank direction, operating by tappets and push rods the overhead rocker gear. This rocker gear is a special feature of the engine, the rockers being mounted on a bracket secured at one end to the cylinder-head and at the other by a tie rod to the crank-case. This arrangement compensates for the radial expansion of the cylinders when hot and automatically maintains the desired valve clearances under all running conditions.

The " Bristol " Triplex carburettor which is fitted consists of three variable-jet carburettors formed in one body and operated by one set of controls. The variable jet greatly facilitates tuning and gives an exceptional range of altitude control, as borne out by the results of official tests in high-altitude scouts. At the same time, great fuel economy is obtained, as was evidenced during the 1926 Zenith Cup Competition, when a Farman machine fitted with Jupiter engine was the winner in this essentially fuel-economy trial. A special air-intake elbow, heated by the hot oil drawn from the engine by the scavenge pump, prevents any possibility of the freezing up of the carburettor, and to ensure a thorough atomisation of the mixture, the induction elbow is exhaust-heated. A special exhaust system has also been developed, particularly for the " Bristol " Jupiter Series VI engine; the diameter of the ring has been reduced and the down pipes kept within the cylinder outline, in order to cut down head resistance. Particular attention has been paid to the design and manufacture of the exhaust rings to ensure their being interchangeable, special non-corrosive alloys being used, making the life of the rings indefinite. To simplify the installation, the rings are entirely supported from the engine, and lugs for the attachment of the cowling are provided on the periphery of the ring.

The 120 h.p. " Bristol " Lucifer Engine

The 120 h.p. " Bristol " Lucifer engine is a three-cylinder unit of great simplicity intended primarily for use in instructional and small commercial aeroplanes. Wherever this engine is in use excellent results have been obtained. In one flying school, for instance, in which six Lucifer-engined machines have been in service for 3½ years, during which about 600 pupils have received training, there has never been a single forced landing from engine trouble. Reports from Chile, where Lucifer-engined aircraft are used for the training of Chilian Army pilots, are equally satisfactory and contain the statement that the petrol consumption is about 20 litres per hour and oil consumption about ¾ to 1 litre per hour.



The " Bristol " Lucifer.

The " Bristol " Lucifer engine contains the minimum number of parts and can be kept in good running order by any average mechanic.

The " Bristol " Cherub Engine

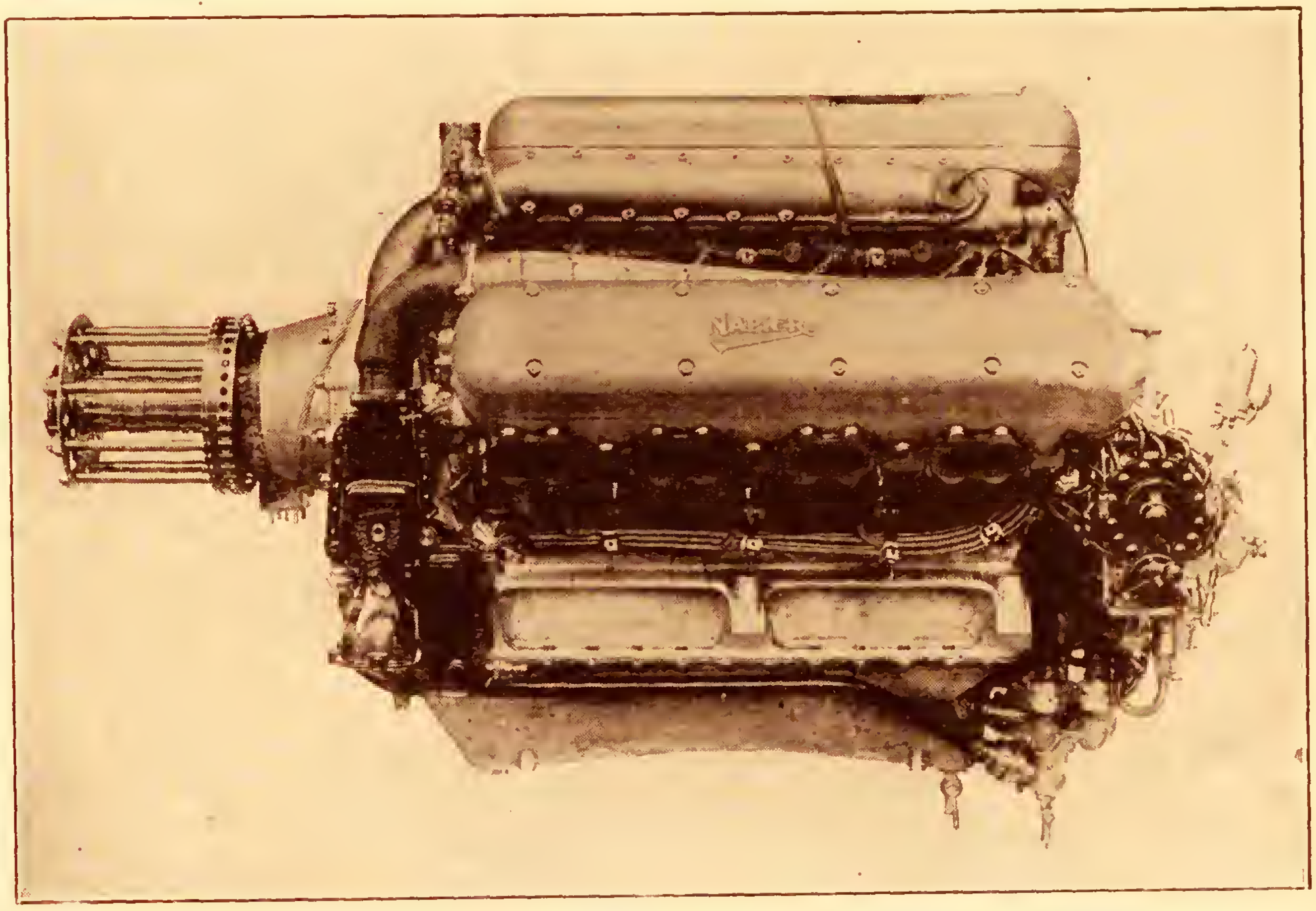
For the past three years the " Bristol " Cherub engine has been recognised as the most successful light aircraft engine in the world, and it has never yet taken part in any flying competition in any country in which it has failed to gain premier awards. During the 1924 and 1925 competitions at Lympne, aircraft fitted with the Cherub engine swept the board. In the 1926 *Daily Mail* competition for reliability and fuel economy, the only four machines which completed the course were fitted with the Cherub engine. In America and Germany its successes in air meetings have been no less remarkable, and during the past few weeks a noteworthy flight in a small two-seater monoplane fitted with a Cherub engine was carried out by Mr. Eberhard von Conta. The journey was from Munich to Rome, during which the whole Alpine system was crossed, an altitude of 14,750 ft. having been attained. On arrival in Rome the machine took part in the 200 km. race for the Coppa d'Italia, for which the pilot was awarded a silver medal, and a return flight was afterwards made to Germany.

D. NAPIER & SON Limited.

THE NAPIER "LION"

A BRITISH ENGINE OF WORLD RENOWN

MANY years ago the writer was making a journey by air when the weather was anything but pleasant. Fog had been met soon after leaving the ground and for hours the machine was flying over continuous banks of fog. During that flight the thought was continually recurrent of what a great responsibility rested upon the engine—what care, thought and excellence of workmanship and materials must be expended in the production of this Napier engine which had gained the confidence of the pilots to the extent that they would rely upon it in such weather with passengers.



The Napier "Lion" Engine: Side view of this famous aero engine, which develops 450 h.p.

To see the construction of the engine is sufficient to understand why such confidence can be placed in this famous British motor.

To follow the manufacture of the engines through, from the time the specially Government-tested material first enters the factory at Acton to the time when the completed engine is undergoing its final test before delivery, is a revelation in accuracy of workmanship and thoroughness in manufacture.

When the material is first received into the works it is tested—both chemically and physically—to see that it is up to the standard which has been specified. From then, after every operation—and there are many thousands—every part is checked to see that it comes within the extraordinarily fine limits set. Thoroughness is the keynote. Nothing is left to chance and nothing is "near enough." It must be right.

Even when the engine is finally assembled and has satisfactorily completed its two-hour test on the bench, it is taken down to the last bolt and nut and every part examined to see that no sign of weakness has appeared in any part. The engine is then assembled again and given another test before delivery.

The Napier Lion has today reached an advanced stage in aero engine development. There is no other engine which has been so consistently developed as the Napier. No other engine has been tried out to such an extent in actual service.

As is well known, the Napier Lion is a twelve-cylinder engine built fan-shape in three blocks of four cylinders each. This form of construction gives a shorter crankcase, a stiffer and simpler crankshaft, and a more compact engine than does the twelve-cylinder Vee construction.

The cylinders are separate, each machined from a heavy steel forging, with the combustion head integral with the barrel. Top and bottom flanges turned on the cylinder have welded to them pressed sheet steel water jackets—these made in two halves and welded on vertical seams—each cylinder and jacket forming thus a separate unit.

These units are assembled into lines of four, held together at the crankcase in the usual method, and at their heads by the combined cylinder head and camshaft casing which is common to all four cylinders of one row.

The head of the cylinder proper is merely a flat machined steel surface provided with orifices for the four valves and their seats. These valve seats, which are separate and replaceable units, are flanged and screwed; they are inserted from within the cylinder barrel and screw into the head casting, securing the head to the cylinders. This cylinder head is an aluminium alloy casting and contains the induction and exhaust passages. The upper surface in addition forms the lower half of the camshaft case and carries four twin bearings for the two camshafts, the bearing for the upper end of the camshaft driving shaft, and the valve stem guides. The latter are of bronze pressed into the casting.

Of the two camshafts which are provided to each row of cylinders, one operates exhaust and the other the inlet valves, and each camshaft lies directly above the line of valves which it controls. The two camshafts are geared together by equal pinions. One of them is prolonged beyond these two pinions and carries at its end the bevel wheel which meshes with that on the camshaft drive shaft. All the cams are formed from the solid and the separation of exhaust and inlet valve cams renders the process of camshaft machining relatively simple. Each cam operates directly upon a flat head on the valve stem without the interposition of rocker levers or rollers.

The valve heads and a short length of the stem are of normal form; but about one valve diameter above the head the stem diameter is increased to, roughly, one and a half times the original diameter, and is bored and screwed internally. Into the screwed upper end the table whereon the cams impinge is screwed, and a rotation of this part relatively to the valve provides an adjustment of the valve clearance.

To lock these two portions together and prevent continual variation in clearances, an ingenious locking device is fitted. The upper end of the valve stem is cut away on two sides and forms a pair of dogs. These fit into appropriate recesses in what is known as a locking ring—a spring steel cup which is slotted and sprung to grip tightly the edge of the tappet head and thus holds the tappet head and the valve stem from moving relatively one to the other.

Within the cylinders, pistons of aluminium alloy operate. These are of very simple design, fitted with two gas rings and one scraper ring above the gudgeon pin and one scraper at the base of the skirt. The pistons are flat topped, very short for their diameter, and are fitted with cast in steel gudgeon-pin bushes.

The corresponding cylinders in each of the three rows share one crankpin, and their impulses are directed thereto by articulated connecting rods. Of these, those pertaining to the central row of cylinders are master rods, and are of "I" section, terminating in a big end. This big end is provided at each side with a pair of lugs between which the auxiliary rods from the side cylinders are hinged.

The crankshaft is short, massive, and is hollow through all journals and crankpins. It is carried on five roller bearings, all of the packed-roller type, *i.e.*, the rollers are practically in contact and there are no cages.

The upper crankcase is a large and somewhat complex aluminium alloy casting, with three sets of cylinder facings outwardly, and the necessary cross ribs for the crankshaft bearings inwardly, with a housing for the airscrew shaft gear cast on to one end.

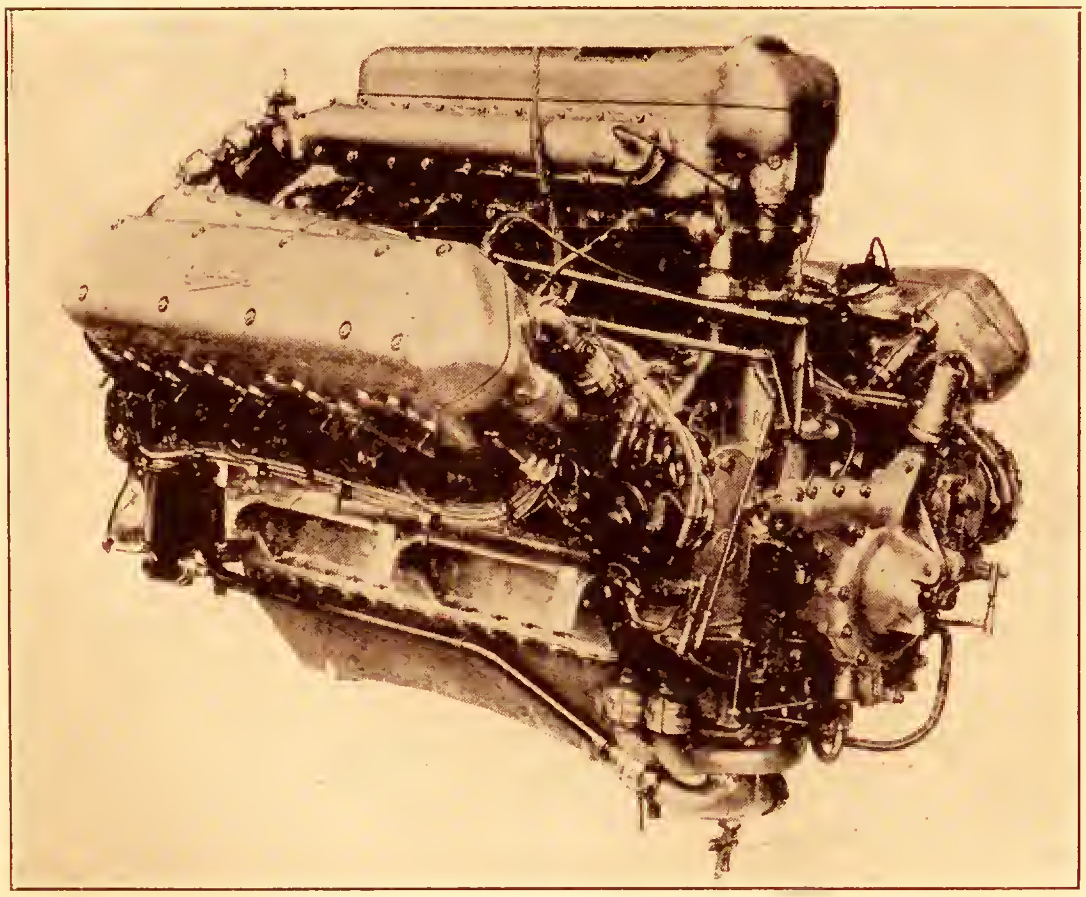
The lower bearing caps are steel straps carried by studs from the webs in the upper crankcase casting.

The airscrew shaft is supported by two roller bearings, one in the housing on the crankcase, the other on the bolted-on cover to the casing. Inwards from this roller bearing, and also carried by the casing cover, is a double ball thrust bearing.

The whole of the valve, pump, and magneto driving gear is external to the crankcase proper. The engine is fitted with a hand-turning gear, with a throw-out arrangement for starting.

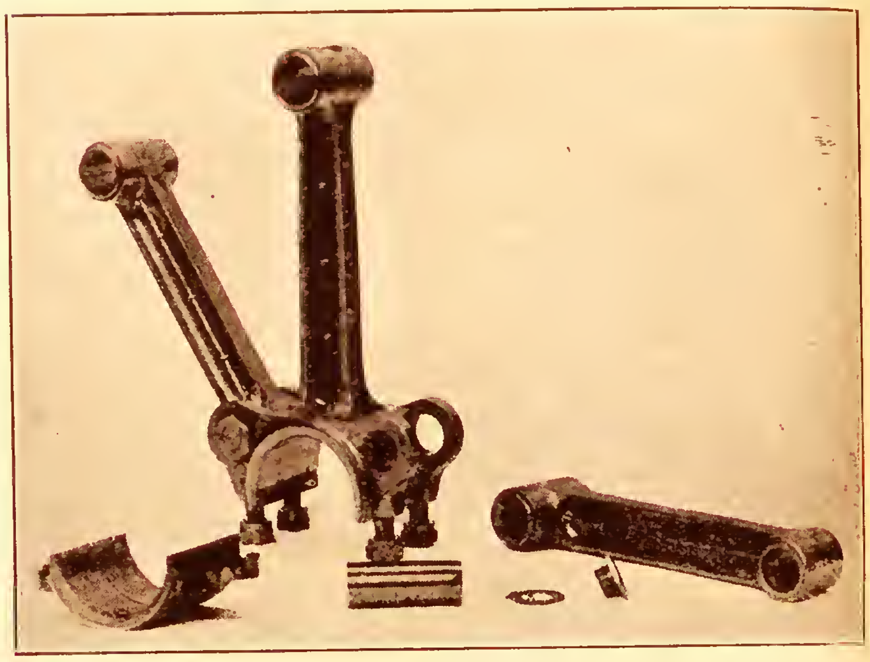
The outer bevel drives two horizontal shafts, which actuate the two twelve-cylinder magnetos. The whole of these gears, the bearings for their shafts, the oil and water pumps, and the magneto brackets form one unit, and are built into a casing formed of two aluminium castings bolted together.

Oiling is on the dry sump principle effected by two suction pumps and one pressure pump, all of the spur wheel type. Oil is distributed in the usual manner through the hollow crankshaft to big-end and gudgeon-pin bearings, the splash from these serving the cylinders. A separate lead from the pressure pump delivery passes to the camshafts (also hollow), and the overflow falls back to the crankcase passing the reduction gear casing *en route*.



The Napier "Lion" engine: Three-quarter rear view.

Gas is supplied to each row of cylinders by what amounts in effect to three carburettors, one for each row. There are no induction manifolds in the ordinary sense of the term; instead, each cylinder head is fitted with an induction channel, in the form of an aluminium cast trough bolted to one side of the head and extending over all the induction ports, and this trough terminates at the airscrew end in a flange whereto an induction pipe may be bolted.



One of the connecting rod units of the Napier "Lion" engine.

Ideas for this engine, which has done so much to make British aeroplanes so famous for their reliability, were first evolved in 1916. Owing, however, to other important Government work which was then occupying the factory, the first Napier Lion was not actually produced until 1918. Since then its rise—literally and figuratively—has been phenomenal.

Almost on the first flight it was taken to a height of 30,500 ft.—undoubtedly a world record at that time, although as it was carried out with a Service machine, no such claim was made.

Each year since has added further laurels to the Napier Lion, whilst 1926 has shown how much this engine does predominate in the world of aeronautics.

During this year the Royal Air Force carried out three long-distance Service flights; in every case the engines selected have been the Napier Lion, which gives some idea of the popularity of this engine with the British Air Ministry.

The first was carried out by four Royal Air Force Fairey machines, each fitted with a single Napier Lion engine. A total engine mileage of 56,000 was flown, and it was the first occasion on which a number of aeroplanes, flying in company, had carried out without a hitch an extended journey in different climates and in such varying temperatures as is met on a flight from Cairo to Cape Town and back again to England. The four machines covered this distance without any trouble of any nature, and without engine renewals or stoppages, or worry of any kind. A noteworthy feature about this flight is that no trouble was experienced at the high altitude aerodromes where the take-off is likely to be difficult owing to the rarefied nature of the air reducing the efficiency of the engines.

The second Service flight was by two Supermarine "Southampton" flying-boats, each fitted with two 450 h.p. Napier aero engines. This was the first long-distance foreign cruise by Royal Air Force flying-boats. The flight was carried out to a set time-table, with full service load, and was adhered to throughout the journey from Plymouth to Alexandria and back again to England, a total engine mileage of

27,000. No trouble whatever was experienced with the aircraft or engines.

The third flight was carried out by two Vickers' troop carriers, each fitted with two 450 h.p. Napier Lion engines, and the journey from Cairo to Aden and back was carried out without mechanical trouble, a total engine mileage of 18,000 being covered. It is of interest to note, as showing the consistency of the Napier engine, that in each one of these flights the engines were taken from store in the ordinary way, and were not specially tuned up for the strenuous flights they had been chosen to undertake.

Another achievement carried out in 1926 was the remarkable flight by Commandante Franco, the famous Spanish aviator, who piloted a Dornier Wal flying boat fitted with two Napier Lion engines, from Spain to Buenos Aires, a total distance of 6,259 miles, in 59½ hours' flying. This flight was carried out by a series of long hops, including a non-stop journey across the open sea of 1,440 miles. This was the first occasion on which the South Atlantic ocean had been flown without change of machine or engine.

In the last few months a most strenous test has been carried out in Germany; a competition was arranged in order to discover the best German commercial seaplane. Out of 17 entries, only 3 survived the trials, which occupied a period of 10 days. The first prize was awarded a Heinkel machine, fitted with the only British Napier engine in the competition.

Following this success, news has just come to hand of two world records which have been awarded the winner of this competition for high altitude whilst carrying heavy loads. On the first occasion an altitude of 3½ miles was reached, with a weight of 500 kgs., and on the second occasion an altitude of 2¾ miles was attained with a machine carrying 1,000 kgs. At the time of writing these records have not been confirmed by the Federation Aeronatique Internationale.

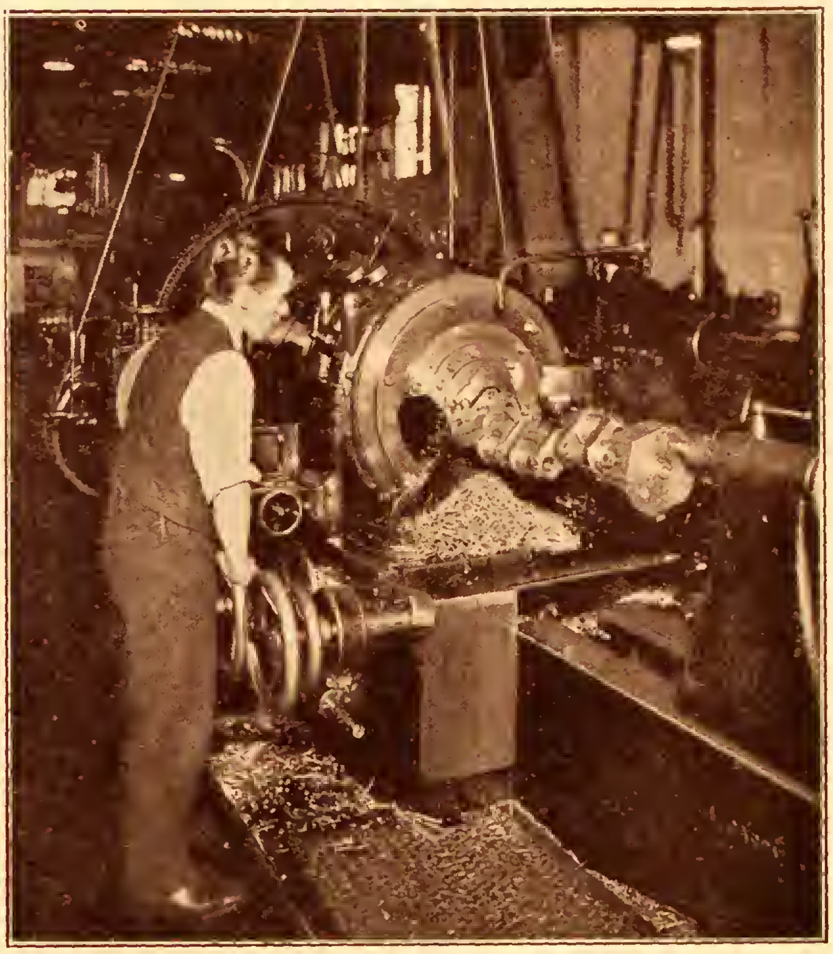
Another phase of flying where the Napier Lion has proved its wonderful efficiency is on the commercial side. Imperial Airways have in use 20 of these engines which have covered an aggregate of over 2,000,000 miles, one engine alone having flown over 200,000 miles. During the 12 months ending September 30, 1926, these Napier engines in use by Imperial Airways covered an aggregate of 566,200 miles without injury to passengers or crew.

In addition to the standard geared "Lion," the Napier Co. also manufacture a direct-drive model, which has given great success, and it is from this famous factory in London that the 1,000 h.p. Napier "Cub" was produced, which is the only engine of this high power to take the air successfully.

The Napier Co. have also achieved considerable success with a racing type Napier "Lion" engine in which the power has been increased to an amazing extent, together with considerable reduction in the weight.

The above is just a brief review of the construction and achievements of the world-famous Napier.

Apart from the British Government, over twenty countries now employ the Napier engine. This world-wide success has been achieved because of the outstanding reliability and high performance of the Napier "Lion," combined with a modern design giving a very high power-weight ratio.



THE NAPIER "LION" IN THE MAKING: Machining the crankshaft.

Below is given a brief specification of the famous Napier "Lion," and attention is drawn to the fact that the weight of the engine dry, complete with reduction gear, airscrew boss and starter, is less than 2 lb. per horse-power developed at maximum speed of revolutions:—

Cylinders, 12 in three blocks of four each, one vertical, two at 60°; horse-power (with 5·8 to 1 compression ratio), 450 at normal speed, 2,000 r.p.m., 502 at maximum permissible speed, 2,200 r.p.m.; speed of airscrew shaft, 1,320 r.p.m.; oil consumption (average), 0·0235 lb. per b.h.p.-hr.; starter, petrol priming system and hand-turning gear; weight of engine dry, 940 lbs. (approx.); weight per horse-power developed, under 2 lb.; length overall to centre of airscrew boss, 4 ft. 9 ins. (approx.); height overall, 3 ft. (approx.); width overall, 3 ft. 6 in. (approx.).

IN THE NAPIER FACTORY AT ACTON: Checking crankshafts, etc., of the "Lion" in the View Room.

ANGLO-AMERICAN OIL Co., Ltd.

(PARIS AGENTS—L'ECONOMIQUE.)

Successful aircraft performance relies upon the qualities and characteristics of fuel used as much as any other item forming a part of the design of the machine concerned. The production of a fuel that will give the best results under a variety of conditions is a vast problem in itself, and that this problem has been tackled with success by the Anglo-American Oil, Co., Ltd., of 36, Queen Anne's Gate, S.W.1—who started marketing motor spirit suitable for aviation engines as early as 1896—is demonstrated by the large number of big aviation events, from the early days up to the present time, that have been accomplished on "Pratt's."

ROUND THE WORLD FLIGHT: One of the Douglas machines, on which the American pilots flew round the world in 1919, being refuelled with "Pratt's."

By way of example, to mention just a few of these historic aviation events: It was in November, 1913, that the late B. C. Hucks accomplished the feat of being the first British pilot to loop the loop and fly upside down in a specially prepared Bleriot monoplane. Subsequently B. C. Hucks carried out a long series of exhibition of looping and upside down flying.

On June 20, 1914, the London-Manchester and back air race, organised by the *Daily Mail* and "Pratt's, was won by Walter L. Brock on a Morane Saulnier monoplane (80 h.p. Gnome), who covered the total 322 miles in the then remarkable time of 4 hrs. 42 mins. 46 secs., or at an average speed of 69 m.p.h.! It may be of interest to recall that Brock passed the finishing line within ten seconds of his handicap time.

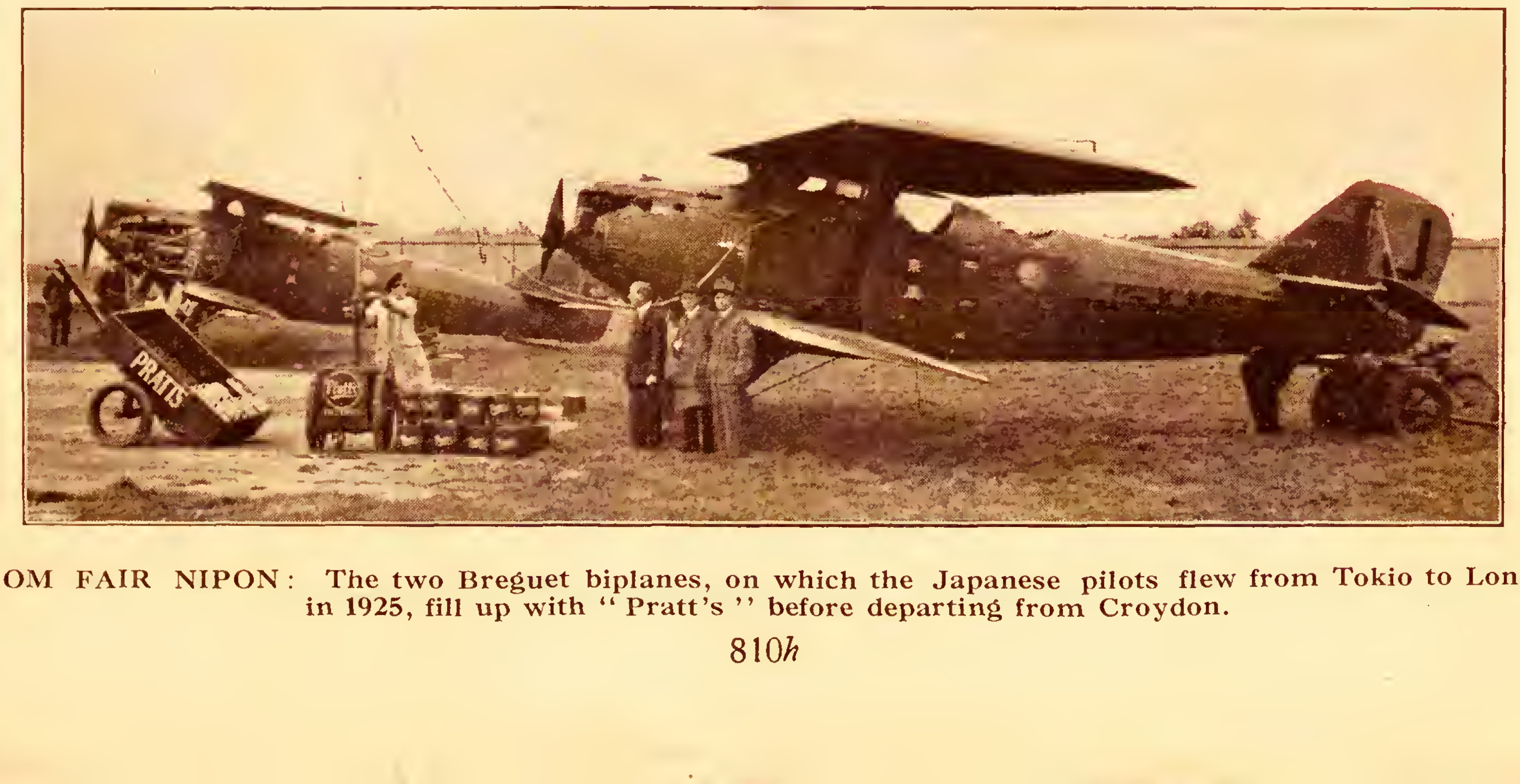
That same year Walter Brock gained another remarkable success—on "Pratt's." This was the International Correspondence Schools, London—Paris—London race, a much more ambitious affair of 502 miles for the double journey. Brock, again flying the Morane Saulnier monoplane, accomplished the double journey in something like record time—in 7 hrs. 3 mins., 6 secs., or at an average speed of 71·5 m.p.h.

Then came the period of the Great War, in which aircraft and Pratt's played such an important part. Peace having been obtained, flying settled down once again to racing and records, and here also "Pratt's" was well to the fore. "Pratt's" was used during the historic American flight round the world, and the high quality of the fuel not only carried the airmen through without a hitch, but the elaborate arrangements for laying supplies of the fuel along the various points of the route were successfully carried out by the Anglo-American Oil Co. In this remarkable flight, it will be remembered that four U.S. pilots, Maj. Martin, Lieuts. Lowell Smith, Erik Nelson and Leigh Wade, set out from Santa Monica, California, in four Douglas biplanes (400 h.p. "Liberty") in an attempt to encircle the world via Alaska, Aleutian Islands, Japan, China, Burma, India, Iraq, Turkey, Austria, France, England, Iceland, Labrador, Newfoundland, and from New York across the United States back to Seattle. Major Martin, the leader, was forced down in Alaska during the early part of the flight and retired, but the other three proceeded, through many adventures, successfully to the end. The total elapsed time of the flight was 175 days, of which 66 were spent actually in the air; the total mileage was 27,534 and the actual flying time was 351 hrs. 11 mins.

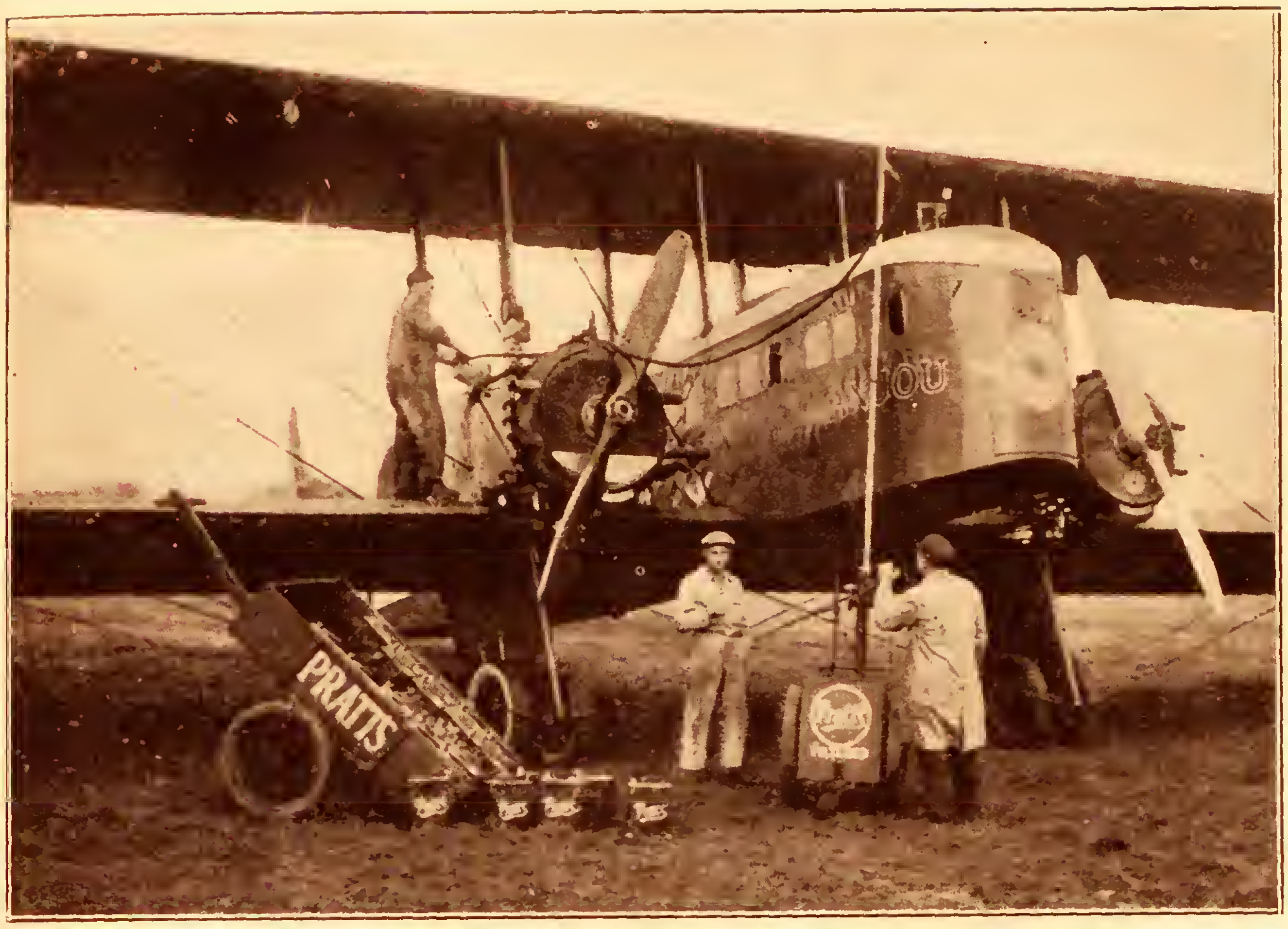
When the Japanese Airmen, Major Abe and Mr. Kawachi, who flew from Tokyo to London in 1925, set out from Croydon on October 19, for the final portion of their big flight, they filled up with "Pratt's", as will be seen from one of the accompanying illustrations.

"Pratt's" was also successful in several of the big post-war racing events, for instance, the 1926 King's Cup Race was won on this fuel by Capt. H. S. Broad, who achieved a remarkable win in this annual event on a "D.H. Moth" light 'plane, fitted with a 27-60 h.p. "Cirrus" engine, after a splendid fight against bigger and more powerful rivals. He completed the two days' 1,464 miles in 16 hrs. 22 mins. 20 secs., or at an average speed of 90.4 m.p.h.

Another "Pratt's" success in the sporting side was at



FROM FAIR NIPON: The two Breguet biplanes, on which the Japanese pilots flew from Tokio to London in 1925, fill up with "Pratt's" before departing from Croydon.

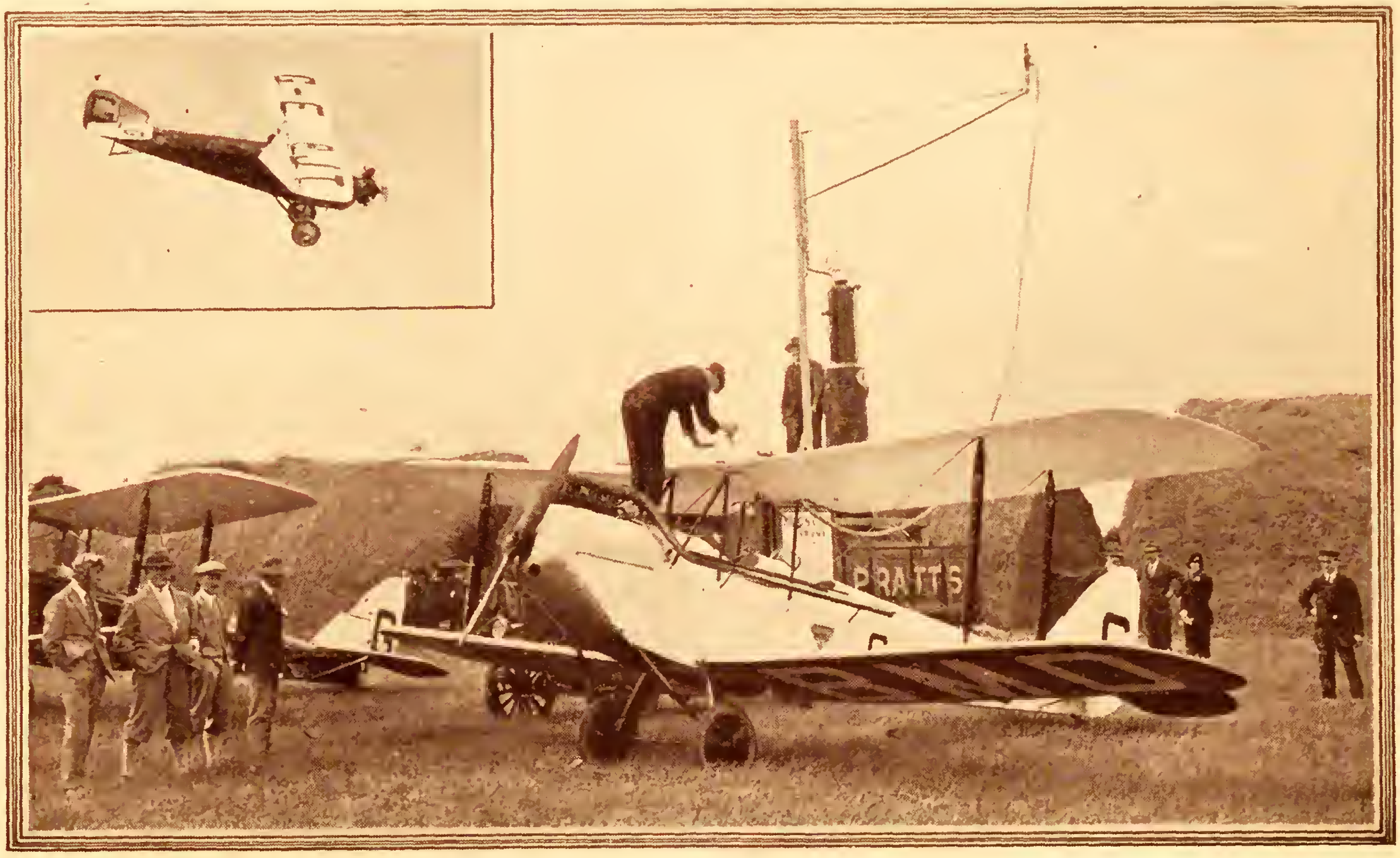


Air Services and "Pratt's": One of the French Air Union Farman Goliath air liners, employed on the Paris-London service, filling up with "Pratt's" at Croydon.

Lympne during this year's light 'plane competitions, when Mr. L. P. Openshaw made fastest time (105·5 m.p.h.) in the Grosvenor Cup Race on the Westland "Widgeon" monoplane, fitted with an Armstrong Siddeley "Genet" engine. "Pratt's" has also found success amongst the recently-formed Light Aeroplane Clubs in their sporting events.

Last, but by no means least, the Anglo-American Oil Co. has important business in connection with the commercial side of aviation, and it is hardly necessary to point out that as regards an air service, carrying passengers, mails and goods, reliability is of the utmost importance. One of the factors necessary in obtaining this reliability is, of course, the use of a suitable fuel—and, incidentally, its supply. In this connection, the Anglo-American Oil Co. has built up a sound reputation, and it may be of interest to note that this firm handles the total business in this country of the French Air Union Co., who operate the commercial air service between Paris and London.

They have an efficient organisation, both at Croydon and Lympne, for replenishing with "Pratt's" spirit the fuel tanks of the Air Union machines during their comings and goings. At Paris and other French air ports, the Air Union's requirements are looked after by their associated company, Messrs. L'Economique, of 82, Champs Elysees, Paris.



"PRATT'S" IN THE WORLD OF SPORT: The 1926 King's Cup Race was won by Capt. H. S. Broad on a D.H. "Moth"—and "Pratt's." The "Moth" is shown above taking in its supply of fuel at Hendon. Inset is the Westland "Widgeon," which made fastest time in the Grosvenor Cup Race at Lympne last summer, using "Pratt's."

CELLON (RICHMOND) Ltd.

A FEW FACTS ABOUT "CELLON" DOPE AND ITS "BY-PRODUCTS"

It was some fifteen years ago, when various kinds of decidedly unsuitable preparations were employed for "doping" the wings of aircraft, that the Cellon firm made the first serious attempt to solve the difficult problem of proofing fabric covering for the wings and other parts of aircraft. They introduced to the aircraft industry of that time preparations known as Cellulose Acetate dopes, under the name—now world-famous—of "Cellon."

"Cellon" met with immediate success and increasing popularity, and by the year 1912, practically every important aviation event—including the winning of the Military Trials by the late S. F. Cody—was won by aircraft doped with "Cellon." In fact, "Doped with 'Cellon'" was, from then onwards, a phrase associated with very nearly every aeroplane or aviation event.

During the succeeding years "Cellon" developed very rapidly, and with the outbreak of war the Cellon firm were obliged to effect considerable extensions of plant in order to cope with the enormous demand for dope, and the present works at Richmond were established. Although the war restricted the supply of raw materials for the manufacture of dope, thus presenting numerous problems, the latter were successfully solved by the Research Department of the Cellon firm.

With the signing of the Armistice, there was naturally a falling off in the demand for dope, but after a time export problems settled down and large and ever-increasing demands for Cellon from abroad kept the Cellon Works busy. Furthermore, with the shortage of Cellulose Acetate during the war it was necessary to make certain dopes from Nitro Cellulose, and the experiments carried out in this connection at the Cellon laboratories provided some valuable data regarding the manufacture of lacquers for industrial purposes—which now forms an additional "line" of the Cellon firm.

Thus, during the last four years, "Cerric" lacquers have been gaining a reputation equal to that of "Cellon," both in the motor car and aviation industries—and others as well. These lacquers, which are obtainable in a variety of grades, possess the advantages of being rapidly applied by means of spray; they dry very quickly and are not readily scratched or injured by the action of heat, oil or petrol.

In conclusion, here are a few recent "Cellon" successes in the world of aviation:—The R.A.F. Fairey IIID aeroplanes which flew from Cairo to Cape Town and back, and the two Supermarine "Southampton" flying-boats which made the Mediterranean cruise, were doped with "Cellon." In the Lympne 1926 competitions the two Hawker "Cygnets," and the Bristol "Brownie" were "Cellonites," as was the Heinkel-Napier winner of the Warnemund competition.

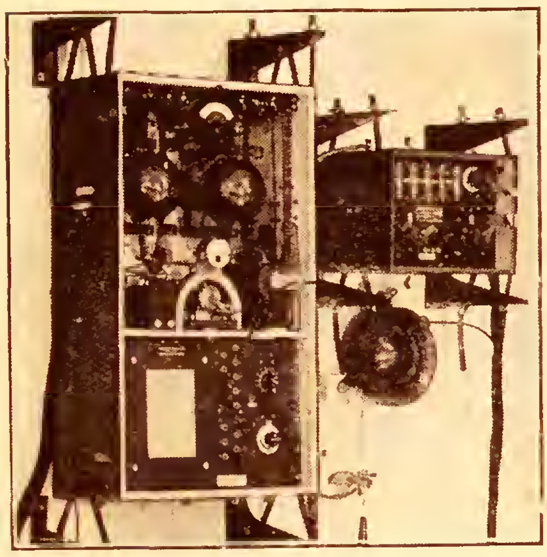
Raw Material for Dope: A portion of the outside Store Yard at Cellon Works, Richmond.

* * * *

MARCONI'S WIRELESS TELEGRAPH Co., Ltd.

MARCONI WIRELESS APPARATUS FOR AIRCRAFT AND AERODROME SERVICES

Wireless plays an important and increasing part in the operation of commercial air services, and it is in no small degree due to the facilities this science offers that civil aviation has so quickly and surely reached its present position. The Marconi Company were pioneers in this field of wireless research, as in so many others, having actively studied its problems since 1912. That their work has been abundantly justified was evidenced by Sir Samuel Hoare, the Air Minister, when, in addressing the Royal Aero Club recently, he said that wireless was now of tremendous help to pilots working in weather which a few years ago would have been regarded as impossible for flying.



The Marconi 500-watt Telephone-Telegraph Set.

For the Imperial Air routes which are being organised to link up far distant parts of the Empire large machines will be used, and powerful wireless apparatus capable of communication over great distances between machines in the air, and ground stations, will be required in the aircraft employed on these services. In anticipation of these needs, and also to cater for similar operations, such as long-distance flights with flying-boats and naval and military machines, the Marconi Company has developed a new and powerful (500-watt) aircraft set, known as the Type AD.8. With this set it is possible for aircraft to maintain telegraphic and telephonic communication over very considerable distances, and it fulfils the requirements of a large class of airships, large aeroplanes, and flying boats as adequately as the well-known Marconi AD.6 set—which has been approved by the Air Council for British Civil Aircraft—meets the needs of medium-sized machines. The wave-range of the transmitter is continuously variable between 600 and 1,500 m., while the receiver has a wave-range of 600 to 4,000 m. Power may be supplied from a wind-driven generator operated by a constant-speed propeller or by a small petrol engine, according to the users' requirements.

In combination with a direction-finder the Marconi Type AD.8 equipment represents the last word in modern wireless practice in connection with aircraft, both for civil and service operations.

Experience with aircraft direction-finders, similar to that which did such excellent service on the Franco flight to South America, and arranged particularly for use on all-metal flying boats where only small loops, with an inferior pick-up, are available, place the Marconi Company in the unique position of being able to quote for the fitting of all-metal aircraft with wireless direction-finders.

Marconi apparatus is being installed on all the machines to be used on the new air route to Egypt and India, which is being opened by Imperial Airways at the beginning of next year; and, since a chain of Marconi aerodrome ground stations is being established by the Air Ministry and the various Governments concerned at frequent intervals throughout the route, the machines will never be out of calling distance of a wireless station.

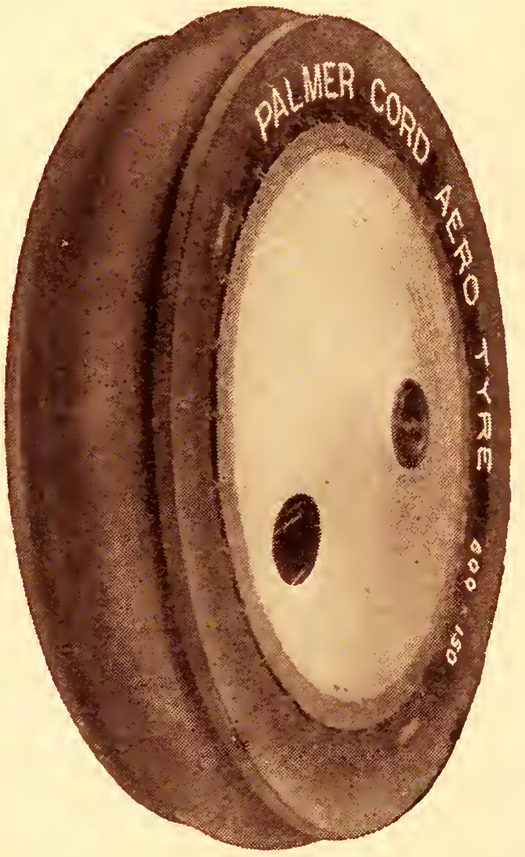
For aerodrome wireless services, the most up-to-date features of design are embodied in the new stations which will be erected by the Marconi Company for the Air Ministry at Croydon Aerodrome in the near future.

PALMER TYRE Ltd.

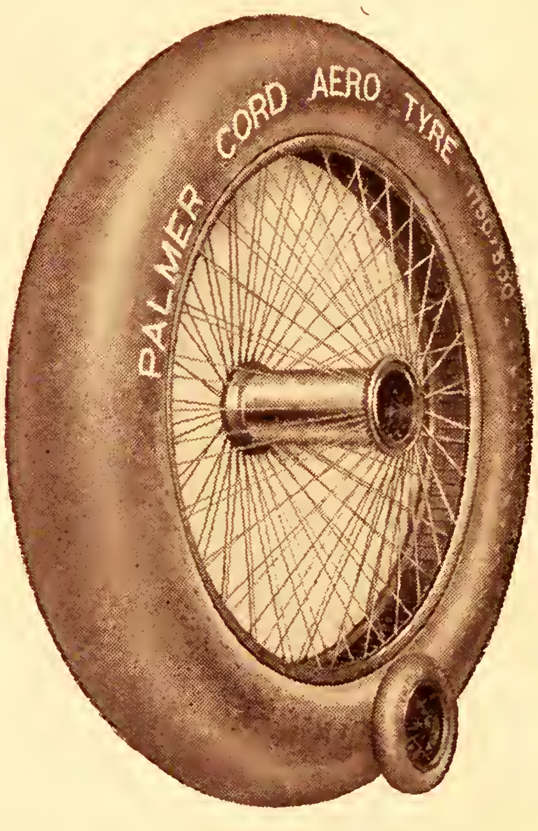
SPECIAL TYRES AND WHEELS FOR AIRCRAFT

In the early days of aviation most of the aeroplanes were provided with bicycle, or small-size motor-car, tyres and wheels for the landing chassis, and this state of affairs obtained over a considerable period—in spite of the obvious disadvantages of such a practice, one, the bicycle wheel and tyre, being much too weak, and the other too heavy.

It was not, in fact, until about 1913 that the problem of the provision of suitable tyres and wheels for use on aircraft was seriously tackled by the Palmer Tyre firm. So many accidents had been caused—and so many machines thereby put out of action—by landing wheel failures, that the R.F.C. (as it then was) decided it was high time that something more suitable for the job be found. Inquiries were sent out to various tyre makers, and as a result the research and experimental department of the Palmer Tyre, Ltd., realising that what was required was something quite different from what wheel and tyre makers had previously produced, approached the Royal Aircraft Factory with a view to obtaining exact data regarding the requirements of aircraft landing gears, their weak points, etc.



The Palmer Aero Wheel, with broad tread tyre, specially designed to facilitate landing on soft ground.



Two of the range of twenty sizes of Palmer Aero Wheels and Tyres.

Having received the necessary information, the Palmer Tyre, Ltd., set to work designing and constructing an entirely new type of aero-wheel and tyre—together with the necessary plant for same—and within six months the first pair of wheels specially designed for aircraft were produced and submitted to the Royal Aircraft Factory for test. Of course, the famous Palmer Cord tyres were fitted to these wheels.

These experimental wheels were subjected to very severe practical test, with such satisfactory results that later in the same year a small contract was placed. Further experiments were carried out, and early in 1914 Palmer Aero landing wheels and tyres, the forerunners of the present-day models in extensive use throughout the world, were available in small sizes suitable for machines then in service. From this small, but well thought out beginning grew the comprehensive Palmer organisation, which provided practically every fighting and bombing aeroplane produced in this country during 1914–18.

That these wheels and tyres were evolved on correct principles is demonstrated by the fact that, apart from several minor improvements that have been effected from time to time, the present Palmer aero wheel and tyre is still fundamentally the same.

One of the special requirements in the design of Palmer aero wheels was that they should be able to withstand very severe lateral stresses. With ordinary beaded-edge tyres as used in cycles and motor-cars, fitted originally to aircraft, the principal trouble experienced was that when landing in a side wind, the lateral stress set up in the tyre caused the "toe" of the tyre bead to lift, which allowed the inner tube to blow underneath and burst, or else the tyre was pulled bodily off the rim.

In Palmer aero tyres a rim of special design is employed, the beads of the cover being so constructed that they are locked in the rim, and are thus rendered capable of withstanding a very great lateral stress without either pulling out of the rim or "lifting" at the toe of the bead. The famous Palmer cord fabric, one of the strongest flexible materials known, enabled a tyre being employed, which, strength for strength, is much lighter than any that can be made from other material.

Several other factors have presented themselves in the evolution of the present-day Palmer aero tyres and rims. One, which the Palmer Tyre, Ltd., has given considerable attention with particularly satisfactory results, is the provision of wheel shields, or side covers. It is obvious, of course, that unless the sides of a wire-spoked wheel are enclosed in some way, the head resistance at high speed will be considerable. In order to reduce this head resistance, and provide some approach to streamline form, Palmer aeroplane landing wheels are, therefore, usually fitted with these shields.

A special and unique feature of the Palmer shield is its attachment by means of wire hooks having a compensating action, which ensure the shields being constantly taut under varying atmospheric conditions, and, after being doped or painted with preparations calculated to produce a certain degree of shrinkage. Furthermore, the Palmer detachable shield can easily be removed, for examination purposes, without disturbing the inflated tyre.

There are two types of these wheel shields, one for attachment to the rim of the wheel and the other for attachment to the side wall of the tyre at about the point of maximum cross section. The latter type, known as "full stream line," is used on high-speed aeroplanes, whilst with certain designs of under-carriages both types of shield are used in combination—rim attachment on the inner side and full stream-line on the outer side.

The Palmer Tyre, Ltd., have also effected considerable improvement in aero landing wheels as regards the wheel rims themselves. These are, of course, essentially different in section from those employed for motor-car tyres, and are of the double channel type, ensuring maximum strength for load carrying, combined with immense lateral stability and minimum weight.

BRITISH INSTRUMENT Co., Ltd.

THE SAVAGE-BRAMSON ANTI-STALL GEAR

As a result of crashes in 1926, seventy-eight deaths occurred in the Royal Air Force, and two hundred and thiry aeroplanes were written off charge. These figures were given in Parliament by the Secretary of State for Air on November 22, of this year.

It is a fact well known to everyone actively connected with flying that the exceedingly high percentage of such crashes, officially ascribed to " an error of judgment on the part of the pilot," are, with very few exceptions, really caused by accidental stalls.

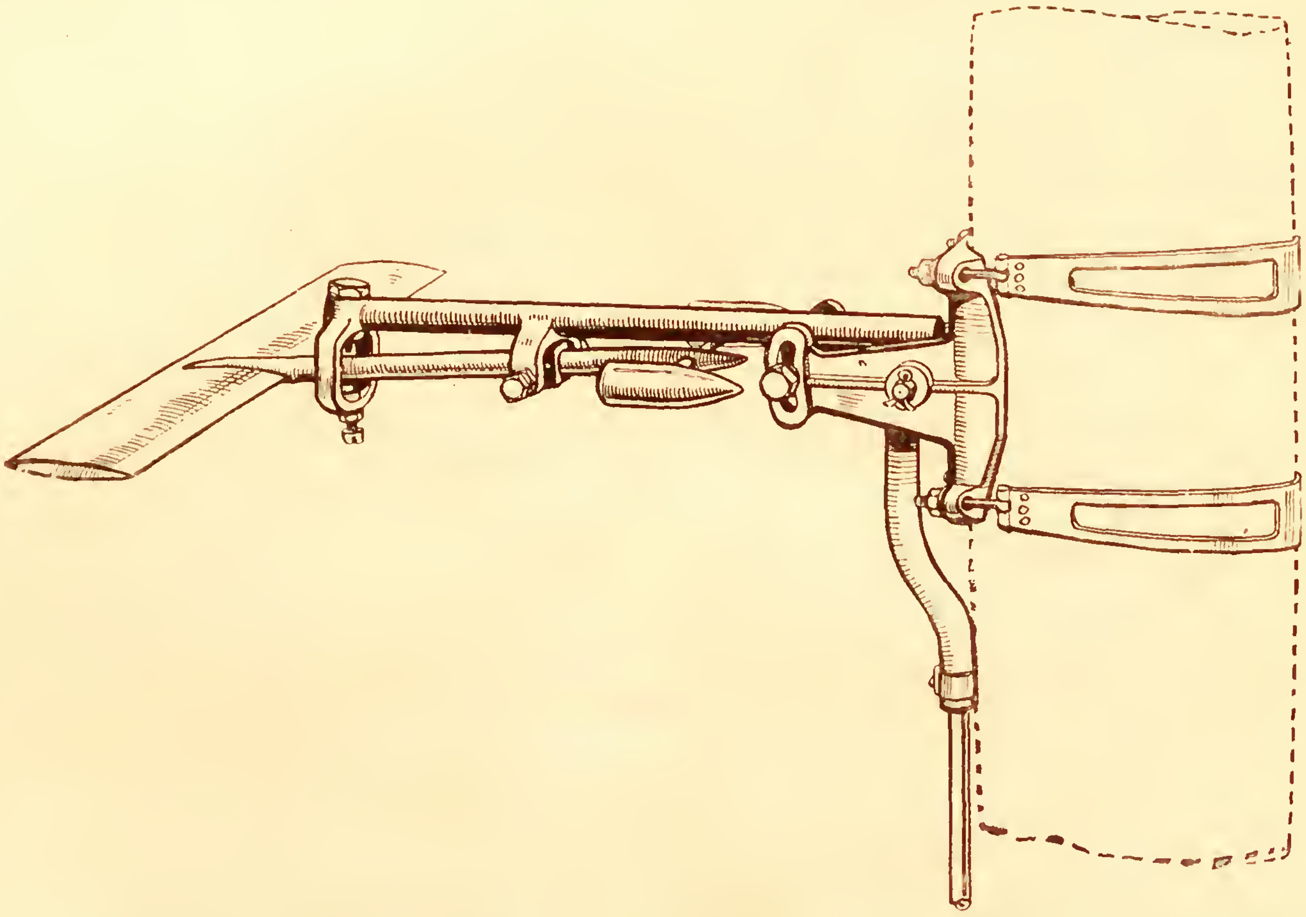


Fig. 1.—The Stall Detector, shown here, is an unstable vane facing the air stream, free to move through an angle of about 70 degs.

It is needless here to enter into any lengthy argument as to whether that official expression is either accurate or just to the pilot. Suffice it here to remark that in most such cases the pilot has had no opportunity of exercising his judgment in the matter, having been given no indication whatever that a stall was imminent and having had all his faculties concentrated on some urgent or difficult task such as, for instance, bringing off a forced landing or finding his way in a fog.

No aeroplane fitted with the Savage-Bramson Anti-Stall Gear, which is illustrated here, can stall accidentally. Just before the stalling point is reached the gear applies a sudden, forward warning force to the joy stick. This force, is equivalent to about 10 to 15 lbs. at the pilot's hand, and should he wish to stall the machine, in spite of the warning, all he needs to do is to incresae his pull on the stick by 10 or 15 lb.

It is, however, *physically impossible* for him suddenly to apply that extra pull *without knowing that he is doing so*. It is clear, therefore, that the warning is of such a kind that it cannot possibly fail to reach him ; nor can it possibly be misunderstood.

The construction and operation of the Savage-Bramson Anti-Stall Gear was fully described in Flight of August 13, 1925, but for the benefit of those who did not happen to read or file that description a brief outline of the gear is given below.

Fig. 1 shows the Stall Detector. It is an aerodynamically unstable wind vane held by a bracket which is attached to a front inter-plane strut, or in some other position of minimum turbulence. Being unstable the vane has only two possible positions, namely on one or other of the stops which limit its angular movement. This angular movement is adjustable, and is normally set to about 7°. Normally the vane rests

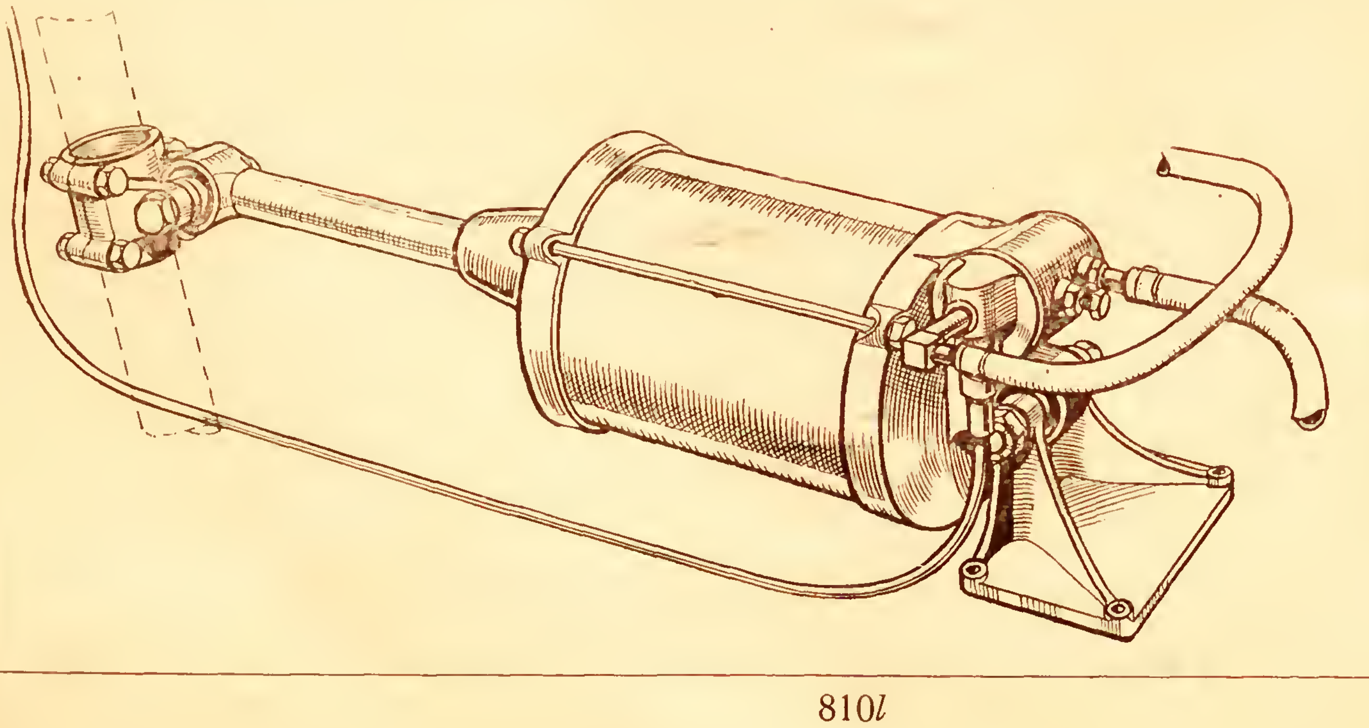


Fig. 2.—The Warning Unit. This is a cylinder, piston and rod, hinged respectively to some fixed part of the fuselage, and to the joy stick, incorporating a pneumatic relay admitting air pressure to the cylinder when the Detector detects an approaching stall.

on the bottom stop, with the air stream holding it down. When the angle of incidence of the wings is increased to such an extent that the wind just begins to blow on the vane from below it flips up to the top stop and there remains till the angle of the relative wind is reduced by 7° from the angle that moved it over. When on the top stop the detector holds open a small valve which causes the Warning Unit to function.

It is clear that if the vane is set, for instance, at an angle of 14° to the chord of the wings then it will flip up to the top stop when the angle of incidence of the wings is 14°. If the incidence at which the machine stalls is 15°, there will be a margin of 1°, and the machine will be under complete control when the detector operates, *i.e.*, when the warning is given.

Fig. 2 shows the Warning Unit. It consists of a cylinder and piston, about 4 in. diameter, to which air pressure of about 15 lbs. per sq. in. is admitted by a "pianola" relay valve when the small valve on the Detector is opened. This pressure is maintained as long as the detector valve is open: it is supplied by the windmill pump (shown in Fig. 3) delivering into the air reservoir (also shown). The piston rod is attached to the joy stick through a universal joint, and the cylinder is similarly attached to some fixed part of the fuselage.

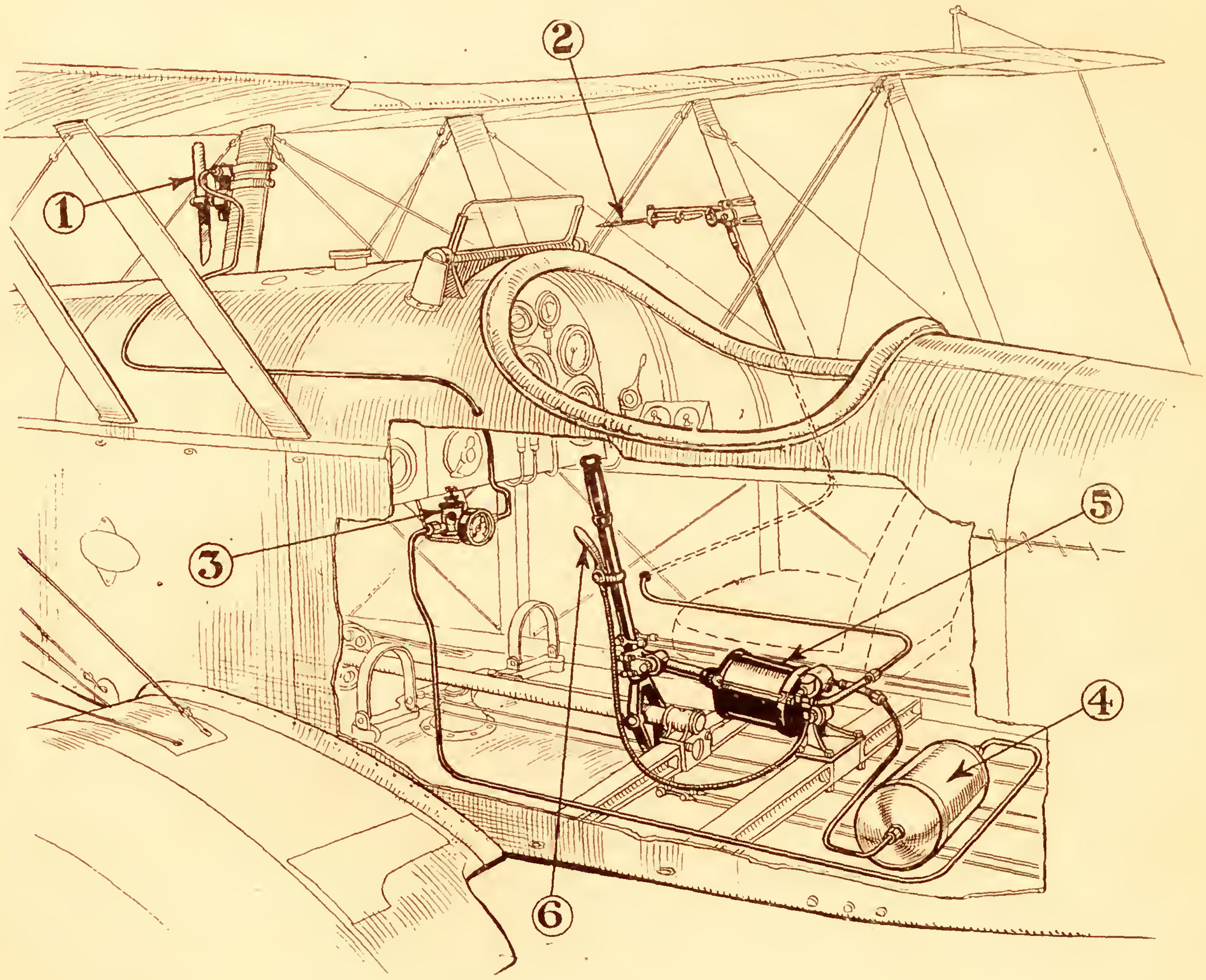


Fig. 3.—The Savage-Bramson Anti-Stall Gear: Installation Diagram. (1) Wind-mill Air Pump; (2) Stall Detector; (3) Pressure Relief Valve and Gauge; (4) Air Reservoir; (5) Warning Unit; (6) Cut-out Control.

The operation of the gear in flight can hardly be more clearly described than by the following extract from a recent official test report:—

"The operation of the device was tested in straight flight and in various manœuvres, such as loops, steep turns and spins . . . The device operated successfully and the indication given of an imminent stall, *i.e.*, a sharp forward force on the stick, is considered a particularly suitable one . . . It seemed very consistent in action, and the indication was positive and of a very convenient nature. At the same time, the force applied could be easily overcome by the pilot and was not enough to put the nose of the aeroplane down violently. It was, in fact, an effectual warning . . . In a spin the device operated on the preliminary stall and stayed in operation throughout the spin in either direction. In taking off it operates if the aeroplane is taken off very tail down . . . The device operated correctly on steeply banked turns in either direction.

The Savage-Bramson Anti-Stall gear has the following distinctive features:—

1. It does not wait for the pilot to enquire from any instrument, or otherwise, whether he is safe. It tells him as soon as he is not safe, and it conveys that message to his brain via his sense of touch. It does not even require a rapid reflex on his part to take correct action; on the contrary, it would require a rapid reflex not to do so.

2. In no circumstances can the gear interfere in the slightest with the pilot's absolute control of his machine.

3. As the gear depends for its functioning upon the stalling incidence of the machine, which is a constant for any given machine, the same adjustment will be correct for all load variations whether static (passengers, goods, petrol) or dynamic (centrifugal loads in a turn, etc.).

4. The type of warning given is identical with that employed by most flying instructors on dual control machines ("A tap on the Joy Stick").

5. Should a pilot endeavour to take off with the tail of his machine too low the warning will be given even before he has left the ground.

6. The Gear can be installed on any existing aeroplane at a low cost, and involves no structural alteration whatever.

7. The total weight for a medium machine is about 8 lbs.

The Savage-Bramson Anti-Stall gear is patented in all the principal countries. The patents cover not only the principles involved but also all important features of design. It is manufactured by the British Instrument Co., Ltd., of Hendon Aerodrome, London, N.W.9, to whom application should be made for further particulars and demonstrations.

In France the gear is being manufactured under licence by Monsieur A. Odier, the well-known constructor and inventor of the aero-engine starter bearing his name.

SHELL-MEX Limited.

"FIRST ON LAND AND FIRST IN THE AIR"

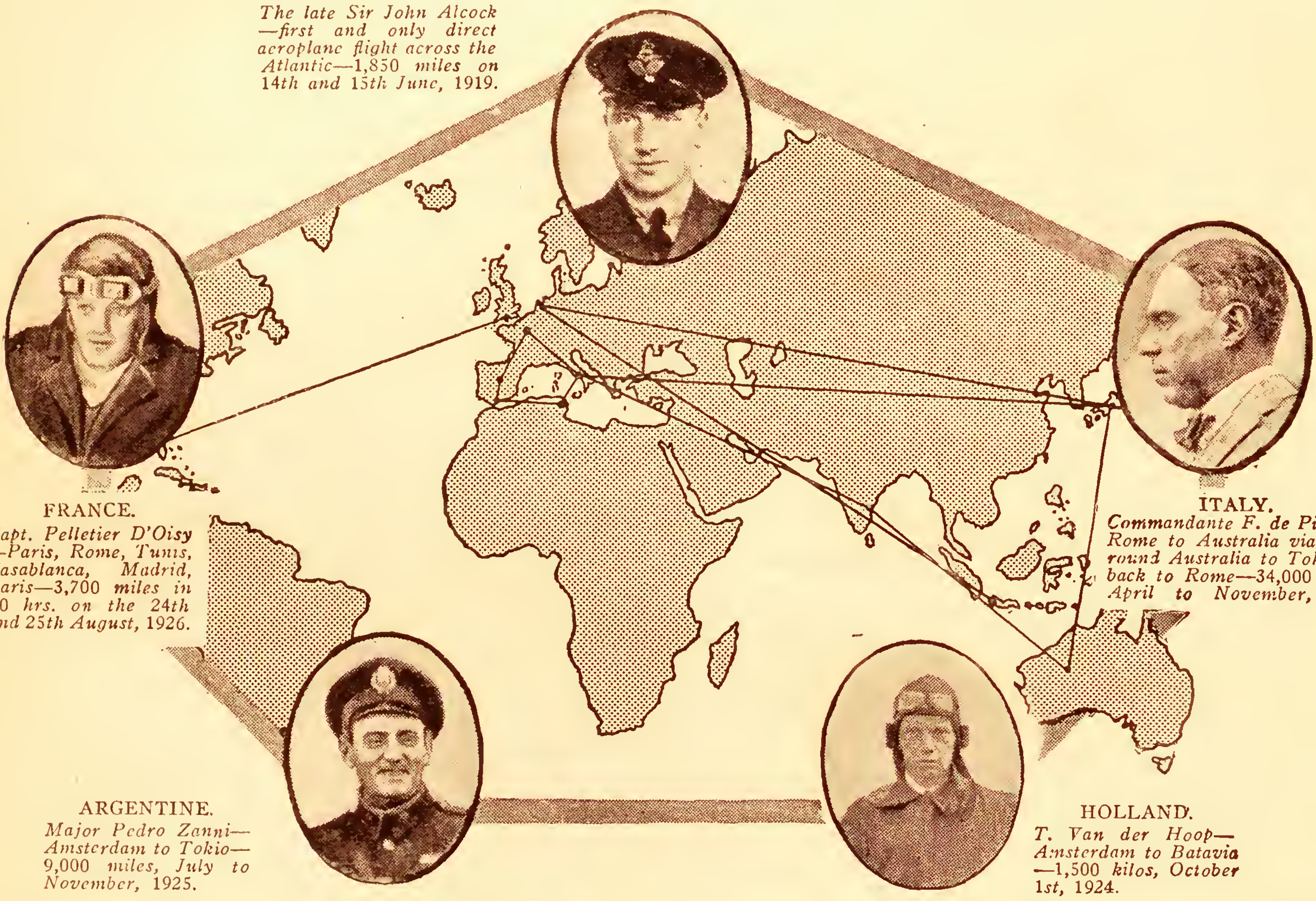
Shell-Mex motor fuel needs hardly any introduction, for the Shell slogan, "First on Land and First in the Air" is not only well known throughout the world, but has been confirmed by practical experience. The various grades of Shell fuel, both for aviation and motor-car purposes, have attained a reputation for reliability and—an important item—suitability. Suitability, that is, for almost every requirement and a variety of conditions.

This position has been attained only by years of very thorough research into the problems appertaining to hydrocarbon fuels, and to careful and scientific production and blending of the different grades of petrol. In short, Shell-Mex, Ltd., being fortunate in controlling the production of petrol in such diverse areas, they are able to *blend* a petrol that combines all the essential qualities for any particular requirement—*i.e.*, a "well-balanced" fuel.

As regards Shell aviation spirit, this contains the various power-elements thus obtained blended to suit the requirements of aero engines. That a suitable and reliable fuel for aircraft has thus been produced is borne out by the fact that practically every big "pioneer" flight by Europe's premier aviators has been accomplished on *straight* Shell aviation spirit, as for example, to mention but a few :—

1919. First Atlantic, Sir John Alcock (1,880 miles).
1919. First London-Australia, Sir Ross Smith (13,500 miles).
1920. First London-Cape, Col. van Ryneveld (6,281 miles).
1924. First London-North Africa, Sir Alan Cobham (1,300 miles).
1924. First England-Japan, Sq.-Ldr. MacLaren (1,300 miles).
1924. First Holland Batavia, Van der Hoop (6,680 miles).
1924. First North Pole Expedition, Capt. Amundsen.
1925. First "Greater than Round the World," Marchese di Pinedo (34,000 miles).
1926. First Spain-South America, Com. Franco (6,260 miles).

In conclusion, it should be mentioned that Shell-Mex, Ltd. have been equally successful with their lubricating oils.



GREAT BRITAIN.
The late Sir John Alcock—first and only direct aeroplane flight across the Atlantic—1,850 miles on 14th and 15th June, 1919.

FRANCE.
Capt. Pelletier D'Oisy—Paris, Rome, Tunis, Casablanca, Madrid, Paris—3,700 miles in 40 hrs. on the 24th and 25th August, 1926.

ITALY.
Commandante F. de Pinedo—Rome to Australia via India, round Australia to Tokio and back to Rome—34,000 miles, April to November, 1925

ARGENTINE.
Major Pedro Zanni—Amsterdam to Tokio—9,000 miles, July to November, 1925.

HOLLAND.
T. Van der Hoop—Amsterdam to Batavia—1,500 kilos, October 1st, 1924.

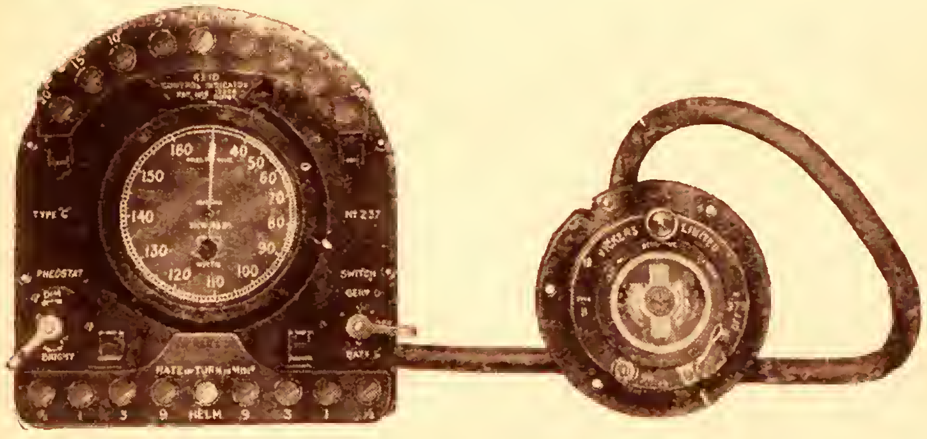
"INTERNATIONALLY PREFERRED" : Five famous aviators, representing five different countries, who relied on Shell aviation fuel—unmixed with anything else—in their respective historic long-distance flights which are indicated in the above diagram.

The Union of South Africa Air Mail Service, which operated between Cape Town and Durban last year, filling up with Shell.

VICKERS Limited.

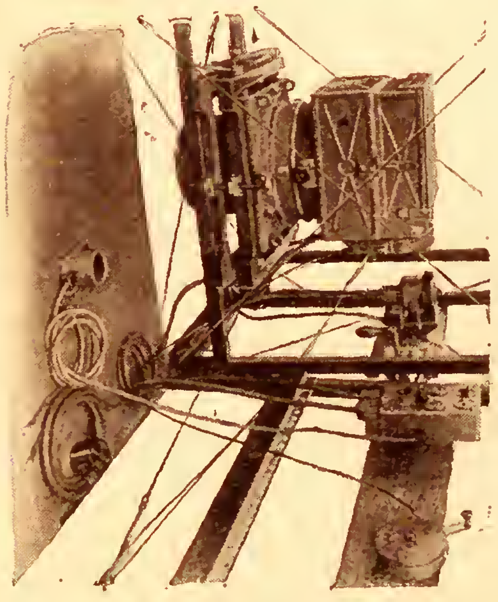
IN such an immense organisation as that of Vickers, Ltd., it is to be expected that, in addition to their wide range of aircraft types, their many factories produce much of special interest to aviation, both from the military and civil points of view. The following notes will indicate, in some slight degree, the wide scope of their manufactures.

FITTINGS FOR THE PETROL, OIL AND WATER SYSTEMS of an aircraft must, of necessity, be as near perfection as can be attained. Vickers have devoted a very great deal of attention to the development of a complete range of such fittings. The new Vickers patent PETROL COCKS are now made almost entirely of Duralumin, the plug being of Vickers Immaculate Steel (Fustless) with bronze seating. These are available in " two-way," " three-way " and "four-way " form, and in sizes from $\frac{1}{8}$-in. B.S.P. to 1 in. B.S.P. A $\frac{1}{2}$-in. two-way Cock weighs 5 ozs. only. Other fittings include Oil and Water Drain Cocks, Petrol Non-Return Valves, Flow Indicators, Relief Valves, Oil Relief Valves, Water Flushing Valves, Petrol Filters, Centrifugal Petrol Pumps (wind driven), the Mark II* (3-in. impeller), and the Mark VI (2-in. impeller), etc.



Vickers Reid Indicator.

The VICKERS (patent) OLEO PNEUMATIC UNITS for UNDERCARRIAGES AND TAIL SKIDS are now standard components of all their aircraft types. This system of suspension has been brought to a state of perfection after very extensive experiments. It employs compressed air as the resilient medium in the place of the somewhat perishable rubber-cord shock absorber used in the past. They are equally efficient for two-wheeled or for four-wheeled chassis, and are made in five standard sizes which cover most existing types of aircraft. Special units can be designed for extraordinary requirements. It is interesting to note that many aircraft constructors abroad, in France, Germany and in the United States, are embodying the Vickers Oleo Unit in their suspension systems.



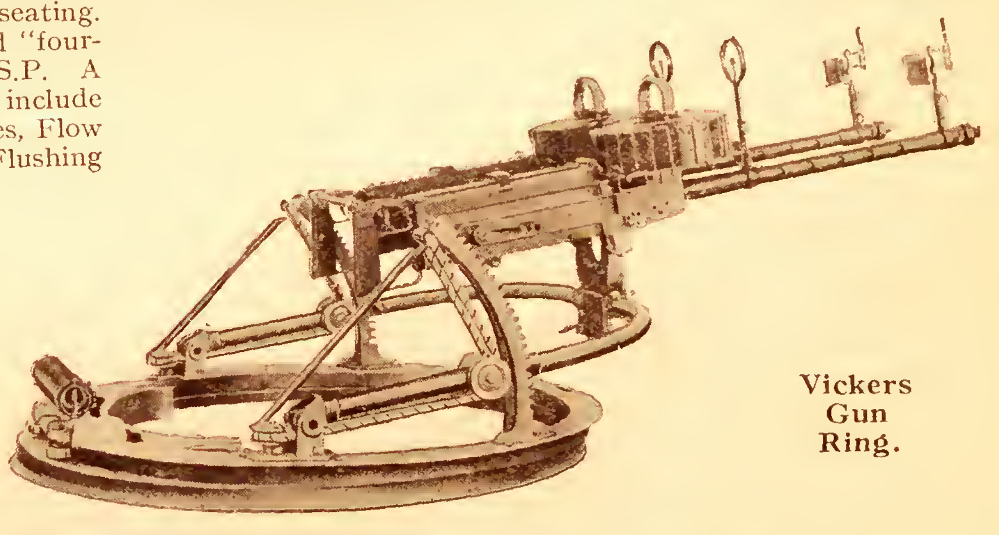
Vickers Eagle Camera.

Other aero specialities include STREAMLINED WIRES and SWAGED TIE-RODS, TUBING of SPECIAL AIRCRAFT STEELS (made at Sheffield), METAL COUPLINGS for petrol pipes. Adjustable PIPE CLIPS (" Malleville " patents), and the Vickers patent UNIVERSAL PULLEY AND GUARD, for bomb gear and for other light duties. The Pulley Unit, which is of Duralumin, can be supplied to contain from one to twelve pulleys with a single steel fixing bolt.

Passing to items of separate equipment, a most interesting instrument is the REID CONTROL INDICATOR, which gives to the pilot an immediate indication of any departure from his set course. The Reid Control Indicator, it may be mentioned, is part of the present standard equipment of every aircraft operated by Imperial Airways, Ltd., and its great value has recently been specially commented upon in an official report of two officers of the Danish Military Flying Corps who, respectively, flew from Copenhagen via Calcutta, Rangoon and China to Yokohama and back to Copenhagen via Siberia and from Copenhagen to Rangoon and back to Copenhagen.

The VICKERS-DAVIS NAVIGATION LIGHTS (Light Pattern), produced from the Weybridge factory, are considerably lighter than the standard " Davis " Navigation Lights of which Vickers also possess the commercial rights, and which are standard equipment for Royal Air Force machines. They are designed to meet all the requirements for Identification Lamps for night-flying aircraft, as laid down by the International Convention of 1919. They include patented Bracket Mountings and a patented dual filament electric lamp. The full set covers Port and Starboard lights Head and Tail Lamps, and, for Seaplanes, Anchor Light and Out-of-Control Lights. Vickers also manufacture ELECTRIC GENERATING EQUIPMENT for aircraft lighting and heating systems, SANITARY EQUIPMENT for passenger-carrying aircraft, and ADJUSTABLE SEATS FOR PILOT AND NAVIGATOR which can be raised or lowered during flight.

The " EAGLE " AUTOMATIC ELECTRIC AIR CAMERA, of which a full description was given in the issue of FLIGHT dated November 11, 1926, is of the greatest interest to all concerned in air photography, either from the point of view of the civil surveyor or from the military reconnaissance aspect. This camera is manufactured by the patentees, Messrs. Williamson Manufacturing Co., Ltd., of Willesden Green, N.W., for whom Vickers, Ltd., are sole selling agents.



Vickers Gun Ring.

Another camera, but for an entirely different duty, is the " HYTHE Mk. III " GUN CAMERA (the product of Thornton Pickard Manufacturing Co., Ltd., of Altrincham). for training in air gunnery, recording, on a film, the results of the pupils' shots.

Vickers also supply the standard Air Force gunnery training apparatus known as the " ROCKING FUSELAGE," the " FIXED INSTRUCTIONAL FUSELAGE," the $\frac{1}{8}$TH SCALE DEFLECTION TARGET " (for use on the 25 yards range), and the " AERIAL GROUND TARGETS."

As regards Armament, with which the name of Vickers, essentially, is associated, space does not permit a description of the many items which come under this heading, but mention should be made of the VICKERS RIFLE CALIBRE AIRCRAFT GUNS, Belt Feed and Drum Feed, the VICKERS 5-IN. AUTOMATIC GUN (all manufactured at the Erith factory), and the range of AIRCRAFT BOMBS, of 20 lb., 50 lb., 112 lb., 230 lb., 520 lb., and 550 lb. types) made and filled at the Dartford Works where also are produced CARRIERS for all these Bombs, and the VICKERS-SCARFF WIND BALANCED AIRCRAFT GUN MOUNTING, which is a development of the well-known " Scarff Ring " used during and since the Great War in almost every Air Force in the world.

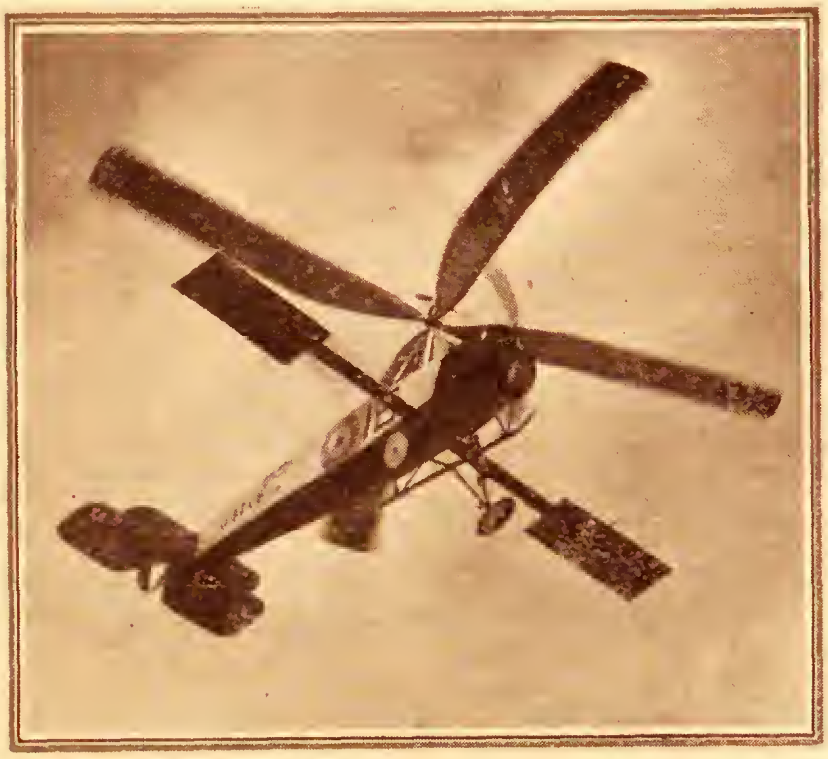
Vickers Dartford factory also produced a comprehensive range of PYROTECHNIC SIGNALS and apparatus for their discharge.

CIERVA AUTOGIRO Co., Ltd.

By CAPT. F. T. COURTNEY

THE Cierva Autogiro Company was formed early this year to develop the now well-known invention of Señor de la Cierva, the Spanish engineer.

The object of this invention was to eliminate the principal defects and dangers of the ordinary aeroplane. The great majority of aeroplane accidents are due to what is known as "stalling." When an aeroplane stalls it loses, practically speaking, all its supporting power and its control. Moreover, this characteristic of stalling and its results lead to the necessity for such skill in flying and such large spaces for landing and take-off, that the elimination of stalling can be said to be a complete revolution in flying. A further defect with the ordinary aeroplane is the lack of natural stability and the consequent difficulty and complication of controls.



The Experimental Autogiro (Avro) in flight.

In various demonstrations in Spain, England, France and Germany the experimental autogiro machine has demonstrated that it overcomes, beyond any question, these main defects of the heavier-than-air aircraft.

The work of the Cierva Autogiro Company has, in effect, been divided into two parts. The first was to prove publicly beyond all question that the autogiro, as a principle, performed all that was claimed for it.

The second part of the company's work was to proceed with the developments necessary to apply these principles to more practical flying machines, for it must be emphasised that the autogiros which have, so far, been flying in public were merely primitive apparatus to demonstrate the principle.

The first part of this work has been accomplished more than satisfactorily, and it is generally recognised throughout the aeronautical world that this invention represents the most important event in flying since the Wright Brothers first flew.

The company is now, therefore, engaged in carrying out an extensive series of experiments on the aerodynamical and mechanical problems which the new feature of this system present. Apart from machines being built by or for different governments, the company is constructing several experimental machines of its own. A great deal of information has already been collected and on completion of the experiments now being made it will be possible to give much more definite data for the construction of machines, of all classes, which will be able :—

1. To take-off and land with little or no run.
2. To be incapable of stalling or getting out of control.
3. Extremely easy to fly and handle.
4. Simple and easy to construct.

The information on which these experiments are based is, to a large extent, complete ; so that it will be only a very short time before a greatly perfected series of aircraft will be able to be built on this system.

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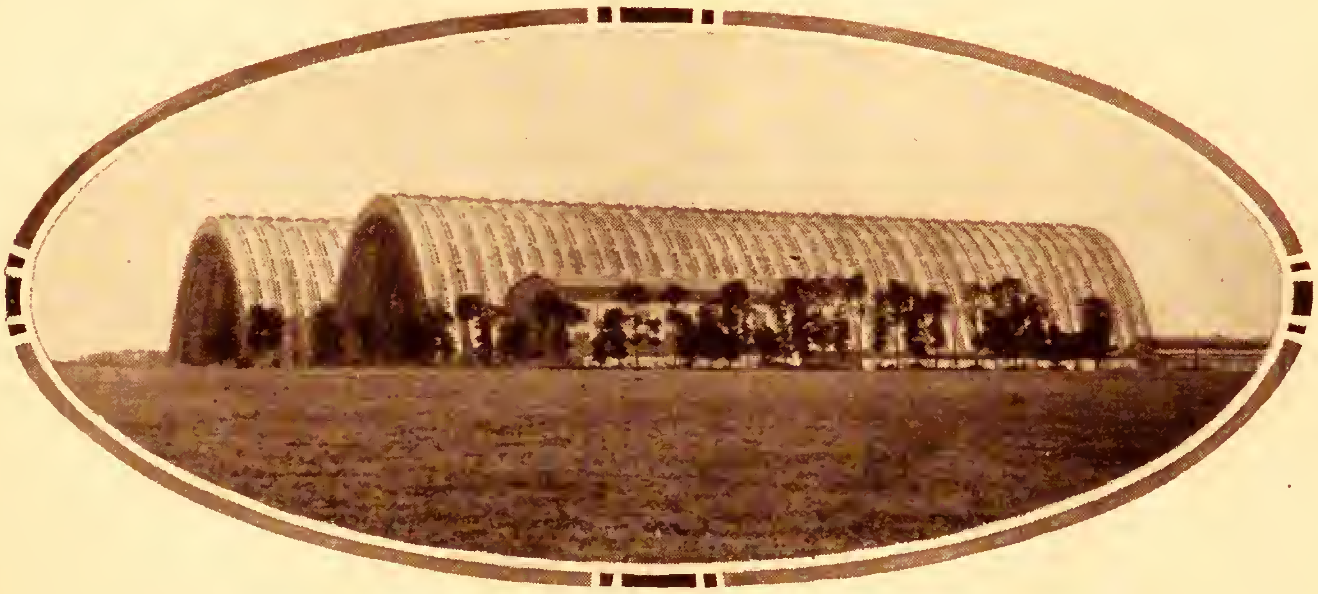


◆

latter there is first a 480 h.p. direct-drive engine ; behind that a 700 h.p. direct-drive, and at the back a 300 h.p. engine. Then comes a 700 h.p. geared engine and a 550 h.p. geared. A 550 h.p. direct-drive engine follows, and a 500 h.p. geared and a 450 h.p. direct-drive complete the exhibit. A large photograph shows the actual 420 h.p. engine which won the great engine competition, completing 240 hours' running in 30 runs of 8 hours each.

It is quite impossible for us to afford the space to give details of this impressive series of engines, and we must confine ourselves to giving brief data relating to the new series of light Renault engines which have been developed from the 420 h.p. model that won the million francs competition. The lighter engines are stated by the makers to be a result of an intense study of component parts, which has enabled these to be lightened without sacrifice in strength and rigidity, and made higher speeds possible with the same reliability as that possessed by the older types.

It is pointed out that the crankcase, camshaft case, etc., have been lightened, the lubrication is on the dry sump principle, various accessories are now grouped at the back of the engine thus giving shorter drives, the crankshaft has been strengthened by making it of larger diameter, although it is lighter than the old one. Detail improvements such as these have enabled a great saving in weight to be accomplished. How great this saving is, since Renault first started making aero engines in 1909 or so, will be seen when it is pointed out that whereas the first 50 h.p. Renault engine weighed 2·5 kg/h.p., the latest high power models weigh but 0·75 to 0·87 kg./h.p.

All the models of which data are given below are of the 12-cyl. water-cooled Vee 60° type, and can be supplied either with direct drive or with reduction gear.

The 450 *h.p.* 12 *Ja* direct drive engine has a bore of 125 cm. and a stroke of 170 mm. The compression ration is 5·6 to 1, and the normal speed 1,800 r.p.m. The nominal power is 450 h.p, and the actual power 470 h.p. The weight is 350 kg. ; the petrol consumption 220 gr./h.p./h, and the oil consumption 15 gr./h.p/h.

The 500 *h.p. type* 12 *Jb.*, which is the geared version of the 12 Ja, has the same bore and stroke and the same compression ratio, but runs normally at 2,000 r.p.m. It is rated at 500 h.p. and delivers 510 h.p. The petrol and oil consumptions are the same as those of the direct drive model and the weight is 380 kg.

The 550 *h.p. type* 12 *Kg*, is a direct drive engine similar to the 12 Ja, but is a slightly larger engine, the bore being 134 mm. and the stroke 180 mm. The compression ratio is 5·6 to 1, and the normal speed 1,800 r.p.m. The nominal power is 550 h.p., and the actual 565 h.p. The petrol and oil consumptions are the same as in the smaller engines. The weight is 460 kg.

The 600-*h.p. type* 12 *Kh.* is the geared version of the 12 Kg. and has the same bore and stroke and compression ratio. Its normal speed is, however, 2,000 r.p.m. and the nominal power 600 h.p., while the actual power is 615 h.p. The consumption is as before, and the weight of the engine is 495 kg.

The 7 0 *h.p. type* 12 *Mc* direct drive engine has the following characteristics: Bore 160 mm. ; stroke 180 mm. Compression ration 5·0 to 1. Normal speed 1,700 r.p.m. Nominal power 700 h.p. Actual power 720 h.p. Petrol consumption 225 gr./h.p./h. Oil consumption 15 gr./h.p./h. Weight 620 kg.

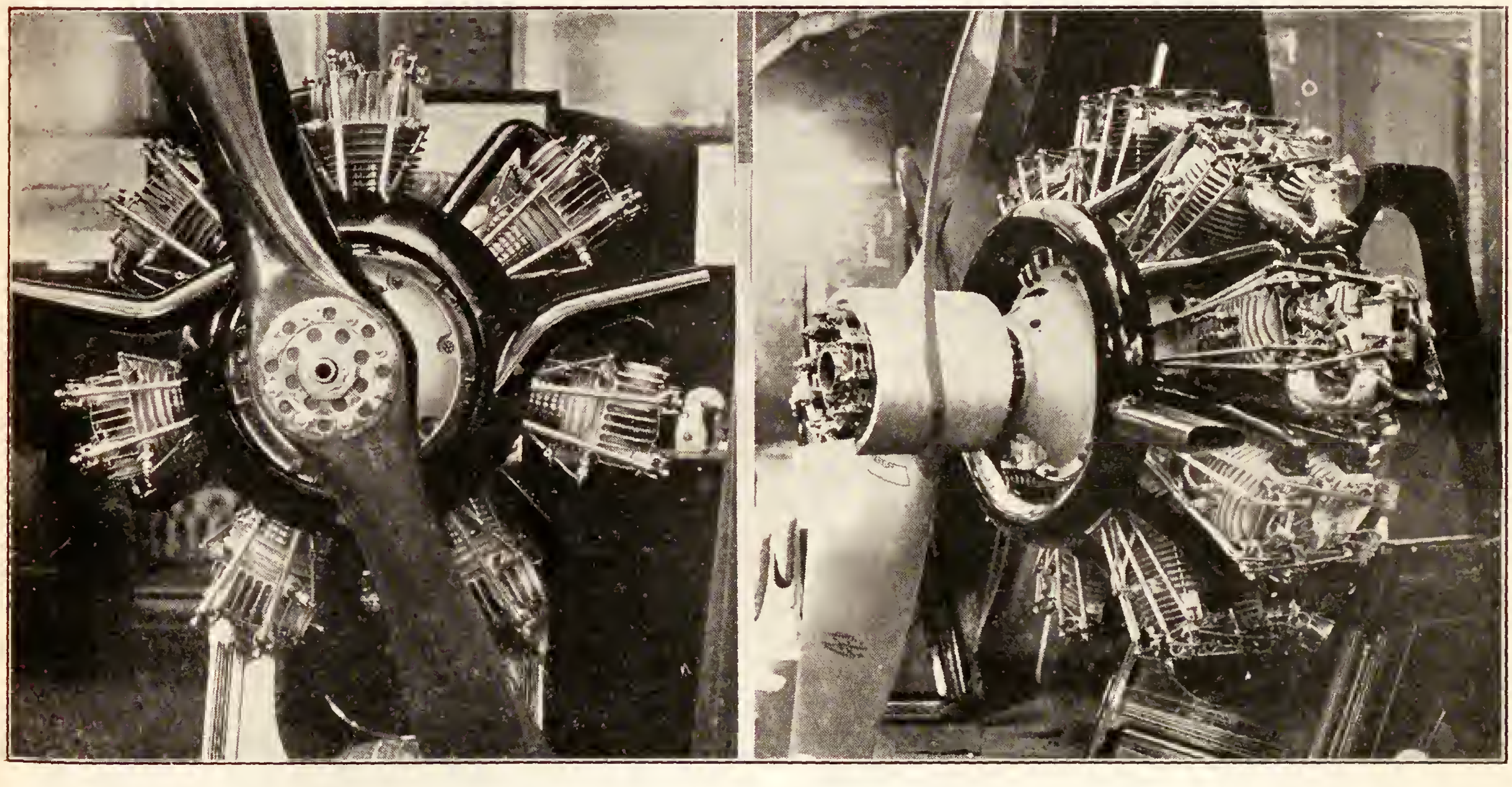
The 700 *h.p. type* 12 *Md* is the geared version of the 12 Mc, and has the same bore, stroke and compression ratio. It runs normally at 1,800 r.p.m. and is rated at 700 h.p., actual, developing 740 h.p. The petrol and oil consumptions are the same a those of the direct drive model, and the weight is 675 kg.

The 12 Jb and the 12 Kh engines can be supplied with two reduction gears, one having ratio of 2 to 1 and the other a ratio of 2 to 1·33. For the type 12 Md, *i.e.*, the largest engine, the two ratios are 2 to 1 and 3 to 2 respectively.

THE SALMSON ENGINES

A FIRM which has specialised on the production of radia aero engines for a great number of years is the *Societe des Moteurs Salmson*, and at this year's Salon the firm has remained true to its traditions in that it exhibits nothing but radial engines, of which seven distinct types are shown, some few of which are water-cooled, but the majority of which are air-cooled. The series of engines shown range from 40 h.p. to 500 h.p., and two of the types exhibited are quite new, one being a 7-cylindered radial air-cooled, and the other an 18-cylindered air-cooled. It will be remembered that, in addition to the engines shown, the firm produces some radials of very low power, *i.e.*, from 12 h.p. upwards, so that one may take the complete range as beginning at this low figure. Thus the firm may justly claim to have "something for every taste."

*The Salmson A.D.*9 is the little 40 h.p. 9-cylinder radial air-cooled engine, fitted, among other types, on the Albert monoplane on which Lieut. Thoret has made some famous long-distance flights. With its comparatively great number of cylinders for the power developed, this engine runs remarkably smoothly, and when flying overhead sounds



ENGINES AT THE PARIS SHOW : Two Salmson air-cooled radials, on the left, the 7-cylinder 95 h.p., and, on the right, the 18-cylinder 460 h.p.

more like a rotary, with its wasp-like buzz instead of the more staccato notes of the majority of radials. It has a bore of 70 mm. and a stroke of 86 mm., and develops 40 h.p. at a speed of 2,000 r.p.m. The weight is 75 kgs.

The A.C. 7-95 h.p. engine is next on the list, taking the engines in the order of power developed. This is one of the two new models produced for this year's Paris Salon, and is a 7-cylinder radial air-cooled, with a bore of 100 mm. and a stroke of 130 mm. It develops 95 h.p. at 1,800 r.p.m., and weighs 130 kgs.

The A.C. 9-120 h.p. engine has the same cylinders, pistons, etc., as the A.C. 7, so that the spare parts that have to be kept are identical. The only difference between the two types is that the larger engine has 9 cylinders and the smaller 7. The characteristics of the 120 h.p. type are : Bore, 100 mm. ; stroke, 130 mm. ; power, 120 h.p. at 1,800 r.p.m. ; weight, 170 kgs.

The A.B. 9-230 h.p. is similar in type to the other engines, *i.e.*, is a 9-cylinder radial air-cooled, but the bore and stroke have been increased to 125 mm. and 170 mm. respectively. This engine develops 230 h.p. at 1,700 r.p.m., and weighs 240 kgs.

The A.B. 18-460 h.p. has the same bore and stroke as the A.B. 9, but has 18 cylinders arranged in two rows of nine each, and a special feature of this engine—which is the second of the two new models to be shown—is that the front and rear cylinders are placed one directly behind the other, instead of being staggered as is more usually the case. The precise reason for this arrangement we have not been able to ascertain. It would appear that the rear cylinders might tend to be somewhat inadequately cooled, although we understand that the manufacturers claim that perfectly even cooling is obtained owing, probably, to the somewhat disturbed flow of the air in the slip-stream from the propeller, which strikes the cylinders diagonally rather than in a direct fore-and-aft direction. The placing of the cylinders behind one another, with the push rods situated in front, has necessitated some rather unusually long rocker arms for the operation of the valves of the rear cylinders. Incidentally, it might be mentioned in this connection that there are only two valves per cylinder. The A.B. 18 has a bore of 125 mm. and a stroke of 170 mm., develops 460 h.p. at 1,700 r.p.m., and weighs 490 kgs.

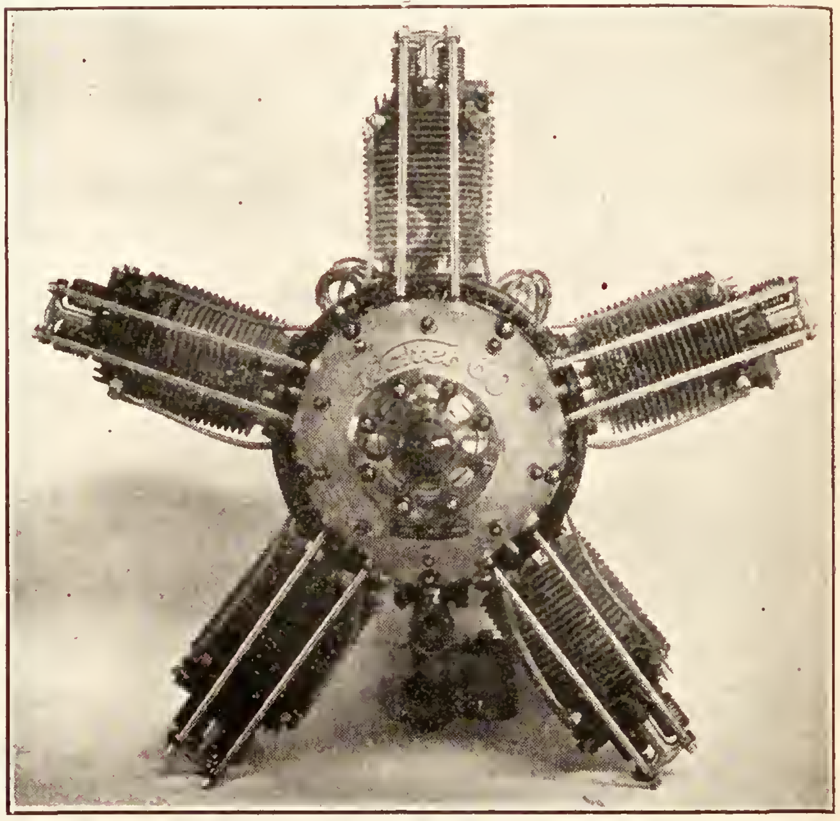
This completes the list of air-cooled engines shown on the Salmson stand. The two remaining engines are of the radial water-cooled type.

The C.M. 9-260 h.p. engine has a bore of 125 mm. and a stroke of 170 mm., develops 260 h.p. at 1,650 r.p.m , and weighs 250 kgs.

The C.M. 18-500 h.p. has its 18 cylinders arranged in two rows of nine each, the cylinders being behind one another as in the 18-cylinder air-cooled, but, of course, water-jacketed. A placard on the stand announces that this engine has been used extensively on commercial machines, and has also been fitted on the Breguet XIX A.2, Potez XXV A.2, and Caudron 107 G.R., as well as on Hanriot and Bechereau machines. An engine of this type completed 150 hours' running in 15 runs of 10 hours each without changing a single part, or even a single accessory.

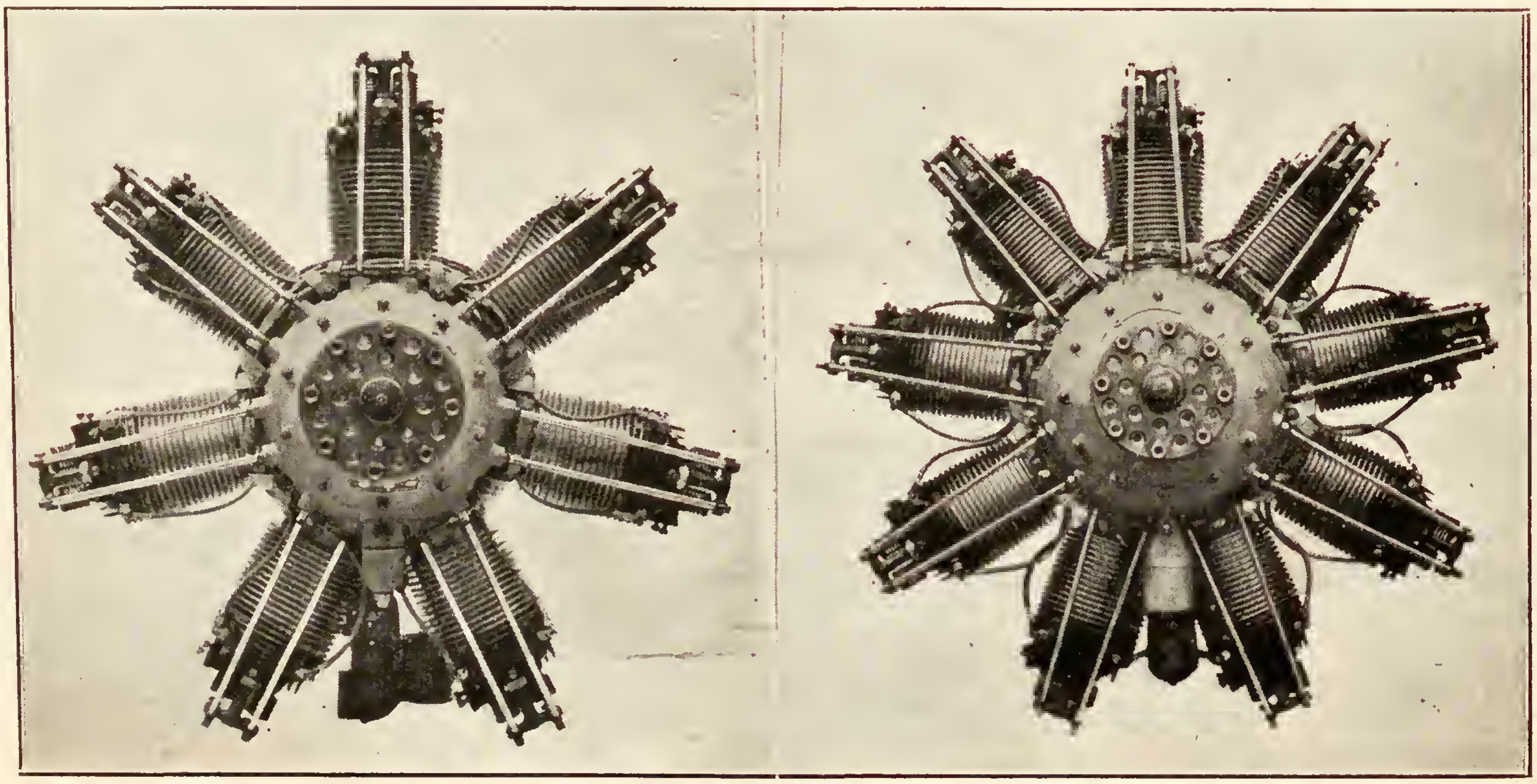
THE WALTER ENGINES

The J. Walter A. Spol Co., of Prague, exhibits three types of engine, all radial air-cooled, ranging in power from 60 h.p. to 110 h.p. All three engines have the same bore and stroke, the same cylinders, pistons, etc., so as to reduce cost of manufacture, and the number of spare parts to be stocked by users of the three types.



ENGINES AT THE PARIS SHOW : The 60 h.p. Walter.

Specification of the "Walter 60" : 5 cylinders ; bore,

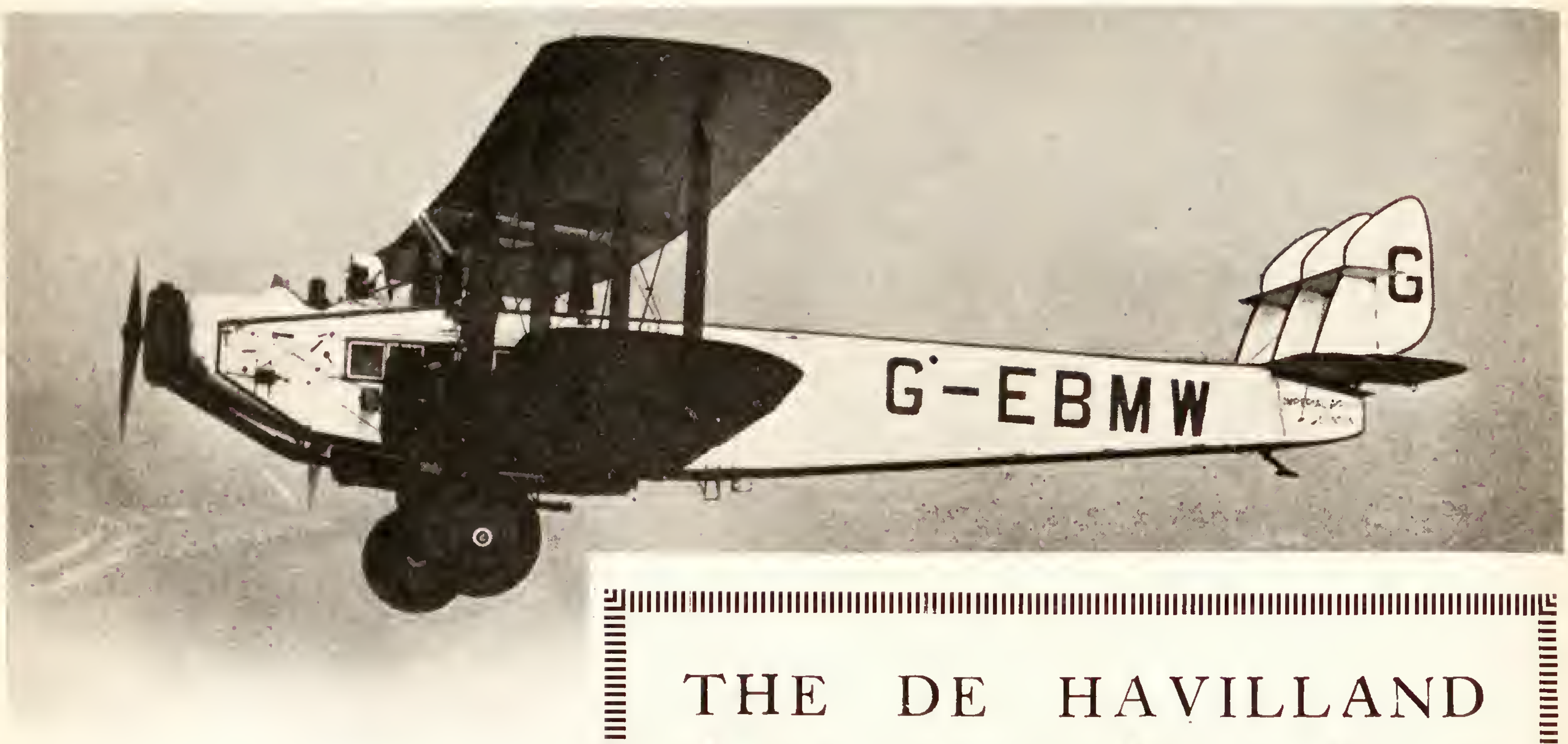


CZECH ENGINES AT THE PARIS SHOW : Two Walter radials, on the left the 85 h.p. and, right, the 110 h.p.

Blackburn
IRIS

Built to operate from the open sea. The result of 18 years experience.

THE BLACKBURN AEROPLANE
AND MOTOR Co. Ltd.
OLYMPIA, LEEDS, ENGLAND.
TELEGRAMS, "PROPELLERS, LEEDS."
LONDON OFFICE: AMBERLEY HOUSE,
NORFOLK ST. STRAND, W.C.2.
TELEPHONE CENTRAL 7522
AUSTRALIAN AGENT:- SQUADRON LEADER
F.E. SANDFORD, EASTWOOD SYDNEY, N.S.W.



THE DE HAVILLAND

HERCULES

THREE ENGINED AIR LINER

ENGINES: 450 H.P. BRISTOL "JUPITER."

"The 'HERCULES' produced to the order of Imperial Airways Limited for the Cairo-Karachi Air Mail Service, is an 'air liner' in every sense of the word. Maximum comfort for the passengers, combined with really high performance and the embodiment of every safety precaution, render it the finest and most up-to-date commercial aircraft in the World."

Vide Press.

The "HERCULES" with full load will take off and climb with only two engines running, and with only one engine only loses height very slowly.

The fuselage frame is constructed entirely of steel, the passenger cabin being mounted internally and insulated with sound-proof material.

A large luggage bay is located behind the cabin.

The cabin can be warmed or cooled by the movement of a small lever.

Sufficient fuel is carried for flights up to 525 miles.

The auxiliary starter motor is operated from the pilot's cockpit.

A complete wireless transmitting and receiving set is installed.

THE DE HAVILLAND AIRCRAFT CO., LTD.,
STAG LANE AERODROME, EDGWARE, MIDDLESEX.
Telegrams: "HAVILLAND, EDGWARE."
Telephone: COLINDALE 6160.

Top Speed - - 130 *m.p.h.*
Cruising Speed- 110 *m.p.h.*
Span, 79' 6", *Length*, 66' 0",
Height, 18' 0".
Rate of Climb at ground level,
765 *ft./min.*

105 mm. ; stroke, 120 mm. ; cubic capacity, 5·3 litres ; normal power, 60 h.p. at 1,400 r.p.m. ; maximum power, 70 h.p. at 1,600 r.p.m. ; petrol consumption, 235 gr./h.p./hr. ; oil consumption, 16 gr./h.p./hr. ; weight, 102 kgs.

Specification of "Walter 85" : 7 cylinders ; bore, 105 mm.; stroke, 120 mm. ; cubic capacity, 7·4 litres ; normal power, 85 h.p. at 1,400 r.p.m. ; maximum power, 90 h.p. at 1,460 r.p.m. ; petrol consumption, 235 gr./h.p./hr. ; oil consumption, 16 gr./h.p./hr. ; weight, 128 kgs.

Specification of "Walter 110" : 9 cylinders ; bore, 105 mm. ; stroke, 120 mm. ; cubic capacity, 9·5 litres ; normal power, 110 h.p. at 1,450 r.p.m. ; maximum power, 120 h.p. at 1,600 r.p.m. ; petrol consumption, 235 gr./h.p./hr. ; oil consumption, 16 gr./h.p./hr. ; weight of engine, 152 kgs.

* * *

PERSONALS.

Married

Edward Geoffrey Rosling, late R.A.F., son of Mr. Percy Rosling, of Shortlands, Kent, was married, on November 18, in London, to Genesta Victoria Alexander, youngest daughter of the late Capt. Ranald Alexander (Black Watch) and Mrs. Alexander, of Ryde, Isle of Wight, and granddaughter of the late Gen. Sir James Alexander, C.B., of Westerton, N.B.

Flight-Lieut. John Stanley Chick, M.C., A.F.C, of Whitchurch, Cardiff, was married on November 25, at St. John's Church, Felixstowe, to Florence Doreen Charrington.

To be Married

The marriage arranged between James Alexander Gordon Haslam, M.C., D.F.C., Flight Lieutenant R.A.F., son of the late Mr. and Mrs. John Bailey Haslam, and Helen Kinnear, eldest daughter of the late Mr. W. M. Cuthbert, of Cape Town, S. Africa, and of Lady Seymour-Lloyd, and step-daughter of Sir John Seymour-Lloyd, K.C., of Headley Grove, Headley, Surrey, will take place at St. Mary's Church, Headley, on December 15, at half-past two o'clock.

The marriage of Harold Aubrey Pearson, M.C., D.F.C., eldest son of the Rev. E. Omar and Mrs. Pearson, 6, Belmont Road, Guernsey, to Irene May, eldest daughter of Mrs. M. Tester, of St. Leonards, will take place at Shanghai on January 10, 1927.

The engagement is announced between Flight-Lieut. Hugh Walmsley, M.C., D.F.C., third son of Mr. and Mrs. James Walmsley, Bexhill, and Audrey, third daughter of the late Dr. J. H. Pim and of Mrs. Pim, Sleaford, Lincolnshire.

The engagement is announced between Mr. L. de Ville Chisman, Flying Officer, R.A.F., son of Engineer Rear-Admiral and Mrs. Chisman, of Brockenhurst, and Rosamund, daughter of Lieut.-Commander Harris, O.B.E., R.N.R., and Mrs. Harris, of Lymington.

The engagement is announced between A. C. Meredith, Flying Officer, R.A.F., son of Mrs. C. Meredith and the late Mr. J. Meredith, of Nottingham, and Marjorie, the eldest daughter of Engineer-Capt. F. G. Haddy, M.V.O., R.N., of H.M.S. *Fisgard*, and Mrs. Haddy, of Southsea.

Death

Squadron-Leader Arthur Bracy Langridge, R.A.F., of St. Andrew's Vicarage, Uxbridge, whose death occurred on November 12, was the second son of the late Henry Langridge, of 54, Victoria Street, London, and Chillies, Buxted, Sussex.

* * *

"Flight" *Photograph*

AT THE PARIS AERO SALON: M. Doumergue, the French President, arriving at the Grand Palais on Saturday.

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The total flying time for the week ending December 5 was 17 hrs. 5 mins.

The following members were given flying instruction :—H. M. Samuelson, Miss Fletcher, E. J. B. King, H. Spooner, W. L. McCleod, D. P. H. Esler, G. C. Bonner, J. A. Simson, A. J. Richardson, J. J. Hofer, M. P. Susman, Miss O'Brien, Lady Bailey, H. Richardson, E. A. Lingard, R. Malcolm.

The following members made solo flights :—O. J. Tapper, C. E. Murrell, G. Terrell, A. R. Ogston, S. O. Bradshaw, W. L. McCleod, N. Jones, D. P. H. Esler, E. S. Brough, N. J. Hulbert, W. Hay, H. Spooner.

The following were given joy rides :—N. H. M. Watkins, B. Waugh, Mrs. Skinner, Miss Spooner, E. S. Brough, Col. O'Meara, Mrs. O'Meara, S. O. Bradshaw.

The late J. S. M. Michie.—In deference to the wishes expressed by a large number of the members, it has been decided to raise a fund for the purpose of erecting a stone over the grave of the late J. S. M. Michie at Kingsbury Church. Members wishing to subscribe are requested to hand their donations to Capt. F. G. M. Sparks at Stag Lane Aerodrome, or send them to the Secretary, at 3, Clifford Street, London, W.1. Donations are limited to 10*s*.

Christmas Holidays.—The club will be closed down during the Christmas Holidays, from Thursday, December 23, to Thursday, December 30, 1926.

The total flying for the month of November was 71 hours 45 mins. made up as follows :—

	Flights.	Members.	hrs.	mins.
"A" Licence Soloists	2	20	18	15
Dual Instruction	83	37	36	30
Joy Rides	24	22	9	25
Practice soloists	2	2	0	30
Tests	43	—	7	5
Total			71	45

S. L. F. St. Barbe is continuing to make satisfactory progress. During his absence the de Havilland Aircraft Company, Ltd., are kindly allowing their Pilot Instructors, A. S. White, Capt. C. D. Barnard, and R. W. Reeve to assist the club.

The inspection of the club by the Air Ministry Committee under the Chairmanship of Air Vice-Marshal Sir Sefton Brancker took place on Wednesday last. The Club was represented by Major R. H. Mayo, Col. the Master of Sempill, Capt. C. B. Wilson, and Wing-Com. T. O'B. Hubbard, Members of the Committee, and H. E. Perrin, Secretary. A full discussion took place in the morning on the various statistics as to running costs, etc., and in the afternoon the Committee visited Stag Lane Aerodrome.

Lancashire Aero Club.

Report for week ending December 4.—Total flying time for the week, 13 hrs. 50 mins., made up as follows : Dual with Messrs. Brown and Scholes : Messrs. Costa, 1 hr. 10 min. ; Twemlow, 1 hr. ; Moore, 45 mins. ; Nelson, 40 mins. ; Miss Brown, 40 mins. ; Messrs. Stern and Blagden, 35 mins. ; Miss Emery, 30 mins.; Messrs. Harper and Fray, 25 mins. each ; Messrs. Dickinson, Newton, and eads, 30 mins. each ; Dobson, 15 mins. ; Anderson and Fallon, 10 mins. each. Solo :—Messrs. Costa, 1 hr. 15 min. ; Leeming, 25 mins. ; Lacayo, Michelson, Twemlow, Blagden, and Cantrill, 20 mins. each. Joy-rides :—With Mr. Lacayo, Miss Mitchell, 25 mins. ; with Mr. Leeming, Miss Jones, 20 mins. ; With Mr. Goodfellow, Mrs. Goodfellow, 10 mins. ; Miss Montgomery, 10 mins. Test flights, 55 mins.

Excellent first solos were made during the week by Messrs. Blagden and Twemlow, while in addition, Mr. Costa joined the select ranks of those who aviate on the Renault-Avro.

The correspondent has momentarily run out of printable comments on the weather. He had been relying on our Mr. Brown for a few choice remarks in Spanish, but apparently they don't have this kind of weather in Spain, and there are no Spanish expletives to meet it.

A total of 77 hrs. 20 mins. flying has been wrested out of the November weather, and even this modest total has taken a lot of doing. It will be remembered that two of our members have already pushed off in search of the sun, and have reached Malta, where they are at present detained by (we hope) the hospitality of the inhabitants. Another member, Mr. J-hn F-shw-ck L--m-ng, frenzied by our grey skies, is also pushing off in the near future. Having offered a prize to members of the club for a height contest, he is about to set a good example by seeking out the highest convenient mountain and making a three-point landing on top of same. Presumably he hopes to find the summit bathed in sunshine somewhere above the clouds, and we hope he is right.

Midland Aero Club Ltd,

Report for week ending November 27.—The total flying time was 7 hrs. 47 mins.

The following members were given dual instruction :—G. V. Perry, A. M. Glover, S. H. Smith, C. Fellowes.

The following made solo flights :—G. V. Perry, H. J. Willis, A. M. Glover R. L. Jackson, J. Brinton, W. Swann. Test flights occupied 43 m.

The Austin "Whippet" was flown on several occasions during the week by H. J. Willis and G. V. Perry, the latter making his first flight on this machine on Saturday.

With the Club "Moths" and Austin "Whippet" and the Avros and the D.H. gas of No. 605 Bombing Squadron, A.A.F., in the air, Castle Bromwich presents quite a busy appearance. All of which should help to create the air sense and revive interest in Aviation.

Report for week ending Dec. 4.—The total flying time was 9 hrs. 40 mins.

The following members made solo flights :—J. Brinton, H. J. Willis, G. V. Perry, R. L. Jackson, E. J. Brighton.

The following members were given dual instruction :—C. Fellowes, O. L. Richards, S. H. Smith.

On Sunday Mr. J. Brinton made the necessary qualifying tests for his Aviator's Certificate.

On Monday Capt. McDonough flew L.W. to Hampton Lucy, in order to give an exhibition of flying over the estate of Sir Henry Fairfax Lucy, Bart., on the occasion of a Meet of the Warwickshire Hounds. Tests occupied 30 mins.

The Hampshire Aeroplane Club

Report for week ending December 2 :—As reported briefly below, the club held its first Annual Dinner at the South Western Hotel, Southampton, on Thursday, December 2. The event was a great success, and a very enjoyable evening was concluded by a humorous debate which was opened by Mr. A. V. Roe placing before the gathering a motion "That Flying Should be Abolished." This motion was opposed by Captain Thomson, representing the Royal Aero Club, and a lively debate ensued, which called forth some very delightful speeches.

Air Vice-Marshal Sir Sefton Brancker was all in favour of abolishing aviation of the Service type, but considered that Civil Aviation had its commendable points, as he said, it does provide a few people with a living wage ! ! !

Flying Officer Clarkson made a very humorous reply to Sir Sefton's speech, and proceeded to explain why "an F./O's lot is not an 'appy one." He considered it a bit hard therefore that we should complain that night bombing squadrons keep us awake at night ; we should think of the poor pilots who have to get into a nasty cold aeroplane and take it up at nine or ten o'clock pip emma, just when they would otherwise be going to bed.

Mrs. Eliott Lynn was entirely in agreement with Mr. Roe, she pointed out that flying is such a delightful sport that it grows on one, and after all, too much pleasure is bad for us.

Many other arguments for and against flying were submitted and to prevent further trouble, Mr. A. V. Roe decided to withdraw his motion.

Towards the end of the evening the Toast Master excelled himself by calling for silence for the Air Vice-Admiral Sir Sefton Brancker, who immediately announced that it had always given him great pleasure to be associated with the Senior Service ; and subsequently the T.M. craved silence for the Rt. Hon. the Lord Louis Manhattan. One supposes that he could not switch his mind off the subject of cocktails.

Altogether a highly successful evening.

G-EBOH is still waiting for its new propeller, but G-EBOI has been putting in good work and in spite of fogs the week's flying time was practically 8 hours. Instruction flying, 5 hrs. ; solo flying, 2 hrs. 45 mins. ; passenger flying, 15 mins.

The following members had instruction :—Copper, 45 mins ; Lieut. Heinemann, R.N., 40 mins. ; Kerry, 35 mins. ; Dickson, 25 mins. ; Shepherd, 25 mins. ; Southcliffe, 25 mins. ; Moloney, 15 mins. ; Perfect, 10 mins. ; Langley, 10 mins. ; Bound, 10 mins. ; and Keeping, 50 mins. Keeping was successfully sent off solo, and shows promise of becoming as good a pilot as he is a footballer. The soloists were :—Rumble, 37 mins. ; Fry, 35 mins. ; Simmonds, 25 mins. ; Perfect, 18 mins. ; Lieut. Graham, R.N., 35 mins. ; Keeping, 10 mins. ; Bowen, 5 mins.

On Sunday, Mr. O. E. Simmonds passed the qualifying tests for his "A" licence.

The first annual dinner of the Hampshire Aeroplane Club was held at the South-Western Hotel, Southampton, on December 2, the President, the Rt. Hon. Lord Louis Mountbatten, K.C.V.O., R.N., presiding.

Among the large company present were : the Mayor and Mayoress (Alderman and Mrs. P. V. Bowyer), Lord Apsley, D.S.O., M.P., Colonel E. K. Perkins, C.B.E., M.P., and Mrs. Perkins, Mr. O. E. Simmonds, M.A. (Chairman of the Club), Mr. R. V. Perfect (Hon. Secretary), Mr. R. H. Bound (Hon. Publicity Secretary), Mr. A. V. Roe, O.B.E., the Rev. E. Bruce Cornford, M.A., the Sheriff of Southampton (Councillor Mrs. Foster Welch), the Deputy Mayor (Councillor J. E. Silverman) and Mrs. Silverman, Mr. R. J. Parrott, Squadron-Commander J. Bird, O.B.E., R.N., Captain F. J. Bailey, Colonel Crichton, Captain Wilson, Captain G. I. Thomson, D.F.C. (chief pilot instructor to the Club), Dr. Butler, Mr. A. N. Clifton, Mrs. Elliott Lynn, and many others.

"The King" was loyally honoured at the call of the chairman, after which a number of very interesting speeches were made, amongst others, by the Mayor, the President, Lord Apsley and Sir Sefton Brancker. Unfortunately, lack of space prevents a report of the speeches, but it may be noted that it was proposed to open a fund to provide for the good equipment of the clubhouse, and the President opened the list with a subscription of £50—several others following his lead with generous offers.

The Yorkshire Aeroplane Club

Report for the week ending December 3 :—Flying took place on two days when 2 hrs. 30 mins. was flown in seven flights made up as follows :—

Solo : 1 hr. 50 mins. ; dual, 15 mins. ; test, 5 mins. ; and a joy-ride of 20 mins. given by Mr. Carter.

Messrs. Lax, Mann, and Watson flew solo, while Mr. Mann also received 15 mins. advanced dual.

The official examiner, Mr. Loton, came over from Brough on Sunday in the hope of being able to pass out the Members ready to take their "A" licences, but our hopes were again damped by the dense fog which enveloped the Aerodrome and showed no signs of lifting by the time dusk fell, so the tests will have to be postponed until the following week-end, when we hope more favourable conditions will prevail.

The Committee is at present considering the purchase of a third machine for the use of solo members. Our choice rests between the Britsol "Brownie," Beardmore "Wee Bee," Parnall "Pixie," or the D.H. "53," the Air Ministry having six of the latter type for disposal by public auction.

The club has already been promised £200 towards the purchase of a third machine provided we are able to find the balance. Further contributions from anyone interested in the club will, therefore, be most gratefully received by the Secretary.

◆ ◆ ◆ ◆

ROYAL AERONAUTICAL SOCIETY

(*Official Notices.*)

Lecture.—The last lecture of the first half of the Sixty-second Session, will be held on Thursday, December 16, at 6.30 p.m., at the Royal Society of Arts, John Street, Adelphi, W.C.2, when Wing-Commander C. Breese, A.F.C., of the Technical Training Section of the School of Technical Training (Apprentices), at Halton, will read a paper on "The Training of Aircraft Apprentices." Colonel the Master of Sempill, A.F.C., A.F.R.Ae.S., Chairman of the Society, will preside.

J. Laurence Pritchard, *Hon. Sec.*

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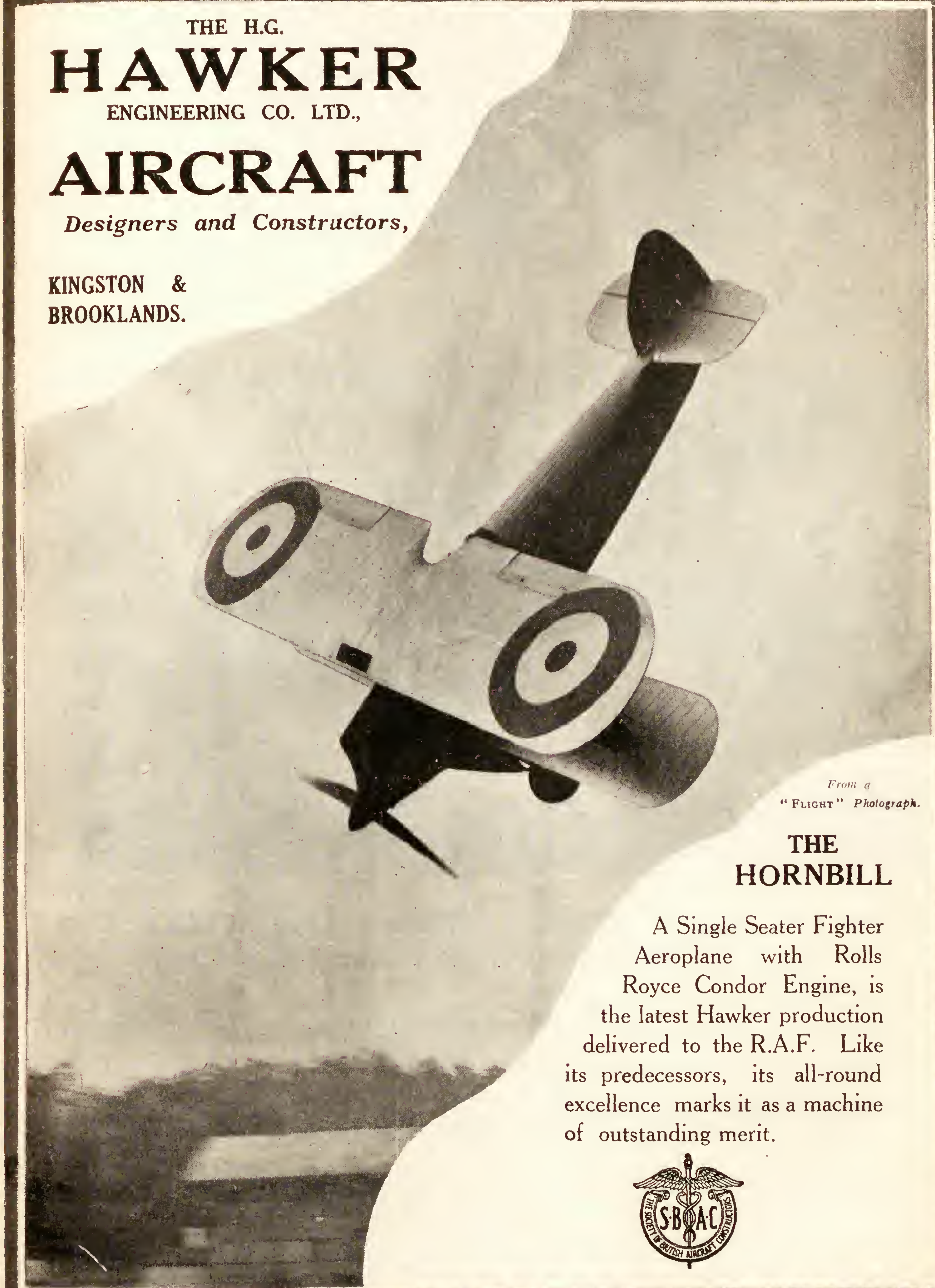

From a
"Flight" *Photograph.*

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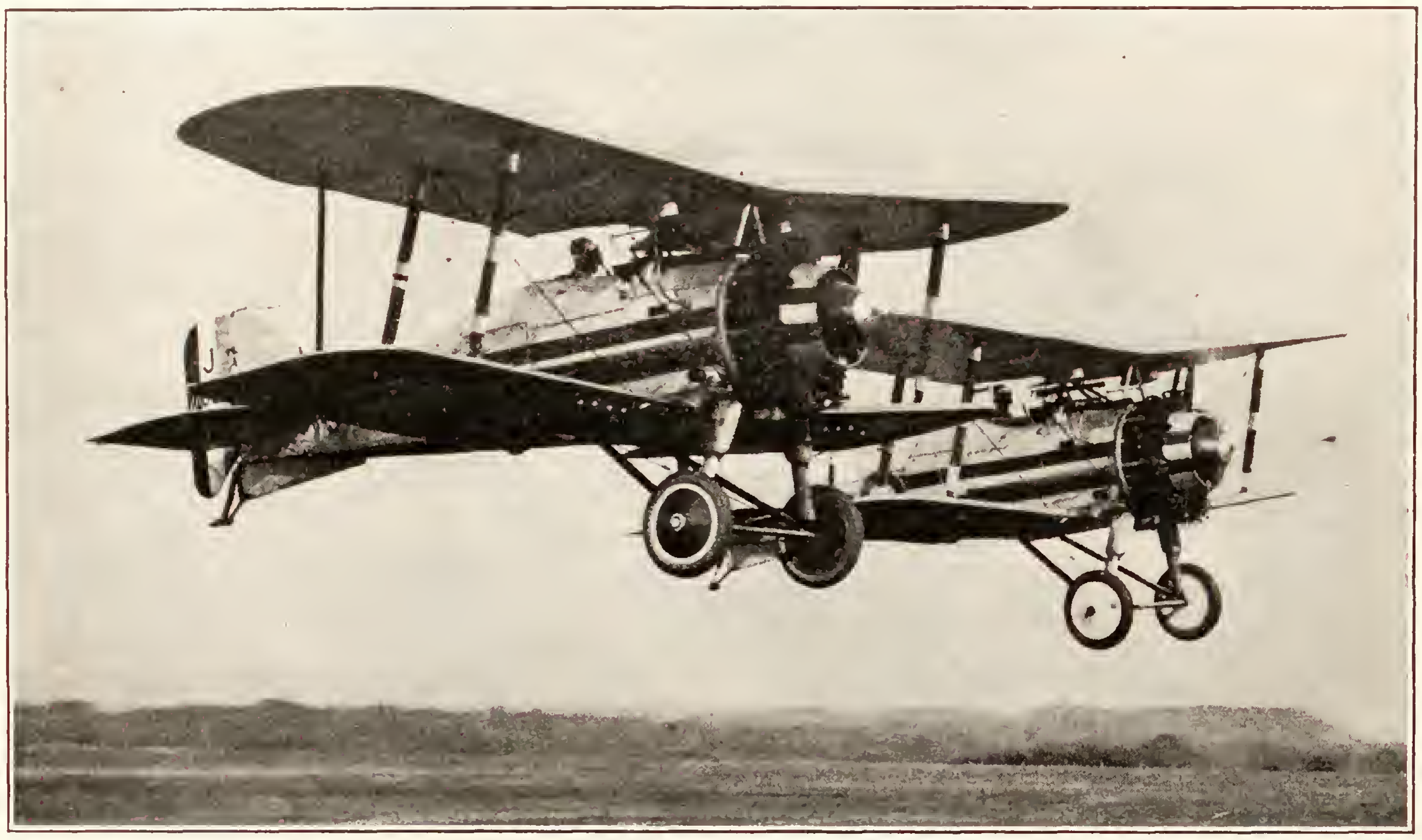

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AIRISMS FROM THE FOUR WINDS.

The School Boys' Own Exhibition

IN addition to a number of interesting diagrams and photographs illustrating the history of aviation, the Air Ministry is lending a complete aeroplane of modern type for the School Boys' Own Exhibition, which will be held at the Royal Horticultural Hall, Westminster, from January 1 to 7 next.

Cherbourg-Southampton Air Service

IN order to save about one day in the transit of passengers and mails to this country from the Atlantic liners, negotiations are in progress between the British and French Governments for the institution of a regular seaplane service between Cherbourg and Southampton. Passengers and mails would be conveyed to the military air port at Querqueville, and travel thence by flying-boat to Southampton, arriving there some time ahead of the liner. A similar service would be run between Southampton and Cherbourg.

The "Moth's" Eastern Tour

CAPT. STACK and Mr. Leete, of the Lancashire Aero Club, who are flying to some destination in the East, made a thrilling flight on November 30, when they flew over Mount Vesuvius, thence by Mount Etna over 60 miles of sea to Halfar aerodrome, Malta. They are the first civilian pilots that have landed at Malta during a flight to the East.

The Schilovsky Turn Indicator

WE understand that the Schilovsky Turn Indicator, which was described and illustrated in FLIGHT for January 29, 1925, has just successfully passed all the Air Ministry Tests, and it is expected that a first order for an instrument will be given to the makers, Messrs. Munro, Ltd. We understand that the latest design of the instrument differs in several respects from the original instrument previously described in FLIGHT. Not only have the Air Ministry introduced several modifications, to meet the requirements of flying in fog and by night, but Messrs. Aircraft Patents, Ltd.—the Licensees of the inventor—have introduced improvements. For instance, the various pointers and scales have been made exceptionally readable under all conditions of flying—being at night, luminous. Lack of space will not allow of further details (these we hope to give later), and we only wish to add that this instrument is now officially called the "Schilovsky-Cooke Turn Indicator," and to offer congratulations on the successful results obtained to all concerned—the inventor, M. Schilovsky, the Technical Staff of the Air Ministry, Mr. G. H. Cooke, and Messrs. Munro, Ltd.

Air Mail Service in Colombia, South America

THE Postmaster-General announces that, by arrangement with the Air Company concerned (Scadta), the present system under which letters and other packets intended for onward transmission by the above-mentioned service can be posted under cover addressed to the Office of that Company in Colombia, and prepaid in Colombian Air Mail stamps, will cease as from December 6; and, beginning on that date, official facilities for such letters will be provided. Under the new system air postage must be prepaid in British postage stamps at the rate shown below, and the letter or packet must bear in the upper left-hand corner a British official blue "Air Mail" label, or be plainly marked in manuscript "Air Mail." Correspondence posted under the new arrangement cannot for the present be registered. The amount of the air postage payable (in addition to ordinary foreign postage at the rate applicable to the class of packet concerned) will be as follows:—On letters and postcards 1*s*. per ½ oz. (or fraction thereof), on printed and commercial papers, samples, etc., 6*d*. per ½ oz. (or fraction thereof). Correspondence which is not fully prepaid with ordinary and air postage will be excluded from Air Mail transmission. The Air Mail serves all parts of the interior of Colombia, and offers a saving of up to ten or more days in transmission of letters to such places as Bogotá, Medellin, Manizales, Bucaramanga and Cali. At most places delivery will be effected by the Air Company or its agents. The dates and latest time of posting for the Air Mail will in general be the same as for the ordinary mails for Colombia, South America, despatched via New York. There will, however, be no late fee posting by boat train at Waterloo or Euston Station in London.

A New Style Commercial Traveller

MR. J. C. PHILLIPP, who has done much flying on various types of aircraft during the past nine years, has started out on a new, and we think unique, venture—that of flying salesman for a vacuum cleaner. Carrying a sample with him, he is travelling over various parts of this country and Ireland by air, making an organised canvass in connection with the sale of this article.

Sir Alan Cobham Visits the White House

SIR ALAN COBHAM, accompanied by Lady Cobham, flew in the D.H. "Moth" from Philadelphia to Washington on December 3. They called at the White House, and were received by President Coolidge.

Another French Flight to Madagascar

ON November 28 the French Military pilot, Commandant Dagneaux, accompanied by Serg. Dufort, left Le Bourget on a Breguet XIXA.2 (600 h.p. Renault) *en route* for Madagascar. He was forced to descend at Lyons owing to fog, but eventually got as far as Marseilles on the following day. He arrived at Alicante on December 2, and proceeded to Oran on December 3, leaving here the following day for Colomb-Beechar.

Australian Survey of Papua

THE Australian Commonwealth proposes to make a complete geological survey of all areas in Papua and the territories of New Guinea under Australian Mandate likely to prove oil-bearing. No doubt aircraft will play a very important part in this work.

A New French Aerial Lighthouse

WHAT is claimed to be the most powerful lighthouse in the world has been constructed by the French Aeronautical Authorities on Mt. Valérien, just outside Paris. Intended to serve as a guide for aircraft, this light will throw a beam of 1,000,000,000 candle-power, visible 60 miles.

End of Australian Pacific Flight

GROUP-CAPT. R. WILLIAMS, Chief of Australian Air Staff, who was forced to abandon the survey flight of the South Pacific Islands, owing to a mishap to his engine, arrived back—in the temporarily-repaired D.H.50 seaplane—in Melbourne on December 7.

Royal Aero Club Monthly House Dinner

THE Monthly House Dinner fixed for the 8th inst. has been postponed until Wednesday, 15th inst., when the subject for discussion will be "Airships," opened by Mr. Griffith Brewer. Lord Thomson will occupy the Chair, and Admiral Murray Sueter, M.P., Lieut.-Col. J. T. C. Moore-Brabazon, M.P., Major Scott and Wing-Commander Fellowes have all promised to attend. Members wishing to attend are requested to notify the Secretary as early as possible as the accommodation is limited to 60.

Operations in Waziristan, 1925.

THE Air Ministry announces:—(1) The India General Service Medal, 1908, in silver, with Clasp "Waziristan, 1925" will, provided that the claims are approved by the Air Council, and subject to paragraphs 2 and 3, below, be granted to personnel of the Royal Air Force who took part in the operations in Waziristan between March 9, 1925, and May 1, 1925 (both dates inclusive), under the command of Wing-Commander (now Group-Captain) R. C. M. Pink, C.B.E., Royal Air Force, and who were located at Tank, Miramshah, Sorarogha, and Khirgi.

(2) Individuals already entitled to, or in possession of, the medal will receive in addition the clasp only.

(3) Individuals who previously qualified for the India General Service Medal with Clasp "Waziristan, 1921-24," (or for the clasp "Waziristan, 1921-24" only) and who also took part in the operations referred to in paragraph 1 above, will be given the option of receiving the clasp "Waziristan 1921-24" *or* the clasp "Waziristan 1925," but will not be entitled to receive both clasps to the medal.

(4) Officers no longer serving may obtain copies of the forms of application from the Secretary, Air Ministry, Adastral House, Kingsway, London, W.C.2, and airmen no longer serving from the Officer in Charge Records, Royal Air Force, Ruislip, Uxbridge, Middlesex. The forms, when completed, should be forwarded to the Secretary, Air Ministry.

AIR MINISTRY NOTICE TO AIRMEN

Revised Notes on the Licensing of Private Pilots (Class A Licences) and the Flight of Private Flying Machines

THE following notes, revised in accordance with the provisions of Air Navigations, 1926, A.N.D.6, are substituted for those published in Notice to Airmen No. 56 of 1925, which is hereby cancelled.

As it is possible that there may be some misconception regarding the regulations governing the issue and renewal of Private Pilots' Licences, *i.e.*, Licences for the operation of flying machines not carrying passengers or goods for hire or reward, the following notes are published for the information and guidance of all concerned :—

I.—Issue of Licence

Requirements.—(1) A person applying for a Private Pilot's Licence will be required to produce evidence of :—(*a*) Medical fitness ; (*b*) Competency ; (*c*) Recent flying experience.

Application.—(2) The applicant must—

(i) Obtain from the Air Ministry a form of application (C.A. Form 2A) and a medical report from (C.A. Form 61).

(ii) Undergo medical examination by a duly qualified medical practitioner, to whom he should hand C.A. Form 61 and who should forward it on completion direct to the Air Ministry.

(iii) Complete C.A. Form 2A and forward it to the Air Ministry, together with three unmounted photographs showing an image of the head not larger than 1¼ × ¾ ins. A fee of 10*s*. must accompany this form, unless the applicant comes under para. 4 (ii), in which case 5*s*. must be sent, together with a fee of £1 1*s*. for the practical flying test (*see* para. 3 (*a*)).

Practical Tests.—(3) If the medical report under para. 2 (ii) is considered satisfactory, and if the applicant is not exempted under para. 4, he will, in accordance with para. 75A of A.N.D.6, be required to prove his competency by—

(*a*) Carrying out certain practical flying tests, viz. :—(i) A test for altitude and gliding flight ; (ii) Tests of skill.

Arrangements for these tests will be made by the Air Ministry and a fee of £1 1*s*. charged.

Technical Examination.—(*b*) Undergoing a technical examination in :—

(i) Knowledge of rules as to lights and signals, general rules for air traffic and special rules for air traffic on and in the vicinity of aerodromes.

(ii) Practical knowledge of international air legislation.

This examination will be conducted orally at the Air Ministry. A syllabus can be obtained on application.

Exemptions.—(4) (i) An applicant who holds a Royal Aero Club Certificate issued between February 1, 1920, and October 31, 1922, or who has qualified as a Royal Air Force pilot, is exempted from the practical flying tests under para. 3 (*a*).

(ii) An applicant who holds a Royal Aero Club Certificate issued after October 31, 1922, is exempted from both the practical tests and the technical examination referred to in para. 3 above.

Recent Flying Experience.—(5) The performance of not less than three hours' solo flying within the 12 months preceding the application is the qualification under para. 1 (*c*). The evidence normally required will be the production by the candidate of his Pilot's Log Book containing the record of this minimum amount of solo flying, or a certificate in a similar sense from an approved person or body (*e.g.*, a flying club).

Validity.—(6) Private Pilots' Licences are valid, subject to medical re-examination in case of serious ailment, for a period of one year from the date of issue.

II.—Renewal of Licence

Requirements.—(7) A person applying for the renewal of a private pilot's licence will be required to produce evidence of recent flying experience.

Application.—(8) The applicant must (i) Forward his licence and a fee of 5*s*. to the Air Ministry. (ii) Furnish evidence as required in para. 5 above of having flown solo for not less than three hours within the twelve months preceding the application.

Practical Tests.—(9) Failing the production of the evidence required under para. 8 (ii), the applicant will be required to carry out the practical tests laid down in para. 80 (*b*) of A.N.D.6 : (*a*) Three figure of eight turns. (*b*) Three landings, finally stopping the aircraft on each occasion within a distance of 50 yards from a perviously arranged point.

Arrangements for these tests will be made by the Air Ministry.

III.—Flight of Private British Flying Machines within Great Britain and Northern Ireland

General Conditions of Flying.—(10) A flying machine may not fly (except for the purpose of experiment or test and subject to certain other conditions, or in accordance with directions or special permission in writing given by the Secretary of State) unless—

(*a*) It has been registered and bears its nationality and registration marks and the name and address of the owner.

(*b*) It has been certified as airworthy and complies with the conditions specified in its airworthiness certificate.

(*c*) Its operating personnel possess the prescribed certificates of competency and licences.

(*d*) It carries the prescribed documents and journey log book, kept up to date in the prescribed form and manner.

Registration.—(11) (i) Application for registration must be made to the Air Ministry on C.A. Form 1 accompanied by a fee of £1 1*s*. A diagram showing how the nationality and registration markings should be painted on the flying machine is sent out by the Air Ministry with the Certificate of Registration if desired. These markings, together with name and residence of owner, must also be inscribed on a metal plate affixed to the fuselage.

(ii) In the event of change of ownership the Air Ministry must be notified and the registration lapses.

(iii) In the event of the flying machine being destroyed, or permanently withdrawn from use, the Air Ministry must be notified and the registration lapses.

Certificate of Airworthiness.—(12) (i) Application for a Certificate of Airworthiness must be made to the Air Ministry on C.A. Form 3 accompanied by a fee of £5 5*s*. in the case of a "subsequent aircraft," *i.e.*, a flying machine which conforms in all essential respects affecting its safety with a "type aircraft" in respect of which a Certificate of Airworthiness has been issued. Fees for "type aircraft" are higher and are based on the "tare" weight ; details are set out in Schedule VI of the Air Navigation (Consolidation) Order, 1923.

(ii) Certificates of Airworthiness are normally valid for one year from date of issue, and are renewable annually after inspection of the flying machine by the Aeronautical Inspection Directorate. For each renewal a fee of £5 5*s*. is charged.

(iii) All flying machines must carry instruments and equipment as specified in Section V of A.N.D.6.

(iv) Overhauls and repairs of private flying machines must be certified by a licensed ground engineer qualified under the terms of his licence to carry out the overhaul or repair in question, or by the authorised representative of a firm or company approved by the Air Ministry for the purpose of giving such certificates. Daily certificates of safety are not required. Certificated flying machines may be inspected by authorised representatives of the Secretary of State, and the Secretary of State may cancel or suspend the certificate of airworthiness of any flying-machine deemed to be unsafe.

Prescribed Documents.—(13) The following documents must be carried in all private flying machines registered in Great Britain and Northern Ireland :—(i) Certificate of Registration. (ii) Certificate of Airworthiness (to be kept in pocket of journey log-book). (iii) Pilot's licence. (iv) Journey log book.

(Journey log-books are obtainable from the Air Ministry, price 4*s*. each ; they are issued only in respect of individual flying machines, and the first page of each book is completed by the Air Ministry before issue.)

Aerodromes.—(14) Private flying machines may operate from unlicensed aerodromes, though they have no right of landing in any place as against the owner of the land or other persons interested therein.

General.—(15) (i) Before flying private flying-machines, pilots should study the provisions of the Air Navigation Orders and Directions (a list of which is contained in Section IV) regulating flight in this country, and in particular those relating to general safety, rules of the air, dropping of articles and prohibited areas.

(ii) Attention is also called to the Investigation of Accidents Regulations and to the requirements with regard to the notification of accidents.

IV.—Air Navigation Regulations

16. The full regulations governing the flying of British aircraft registered in Great Britain and Northern Ireland are to be found in the following publications, all of which are obtainable from H.M. Stationery Office, Kingsway,

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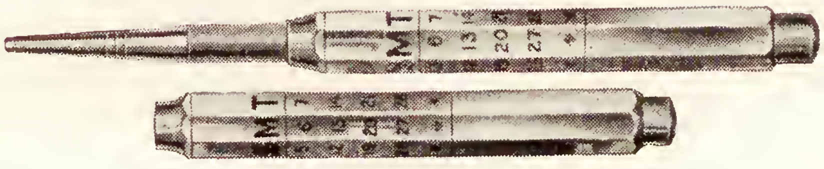

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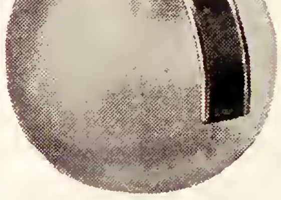

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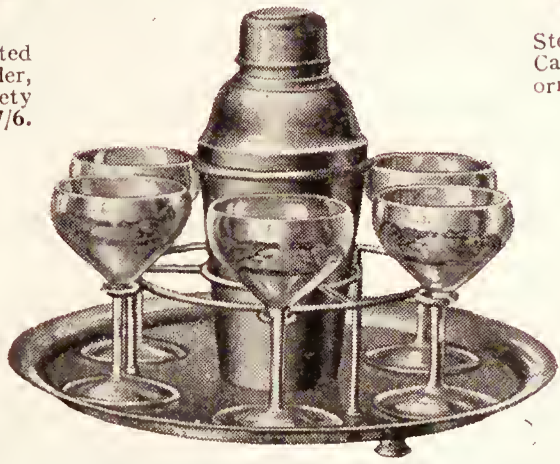

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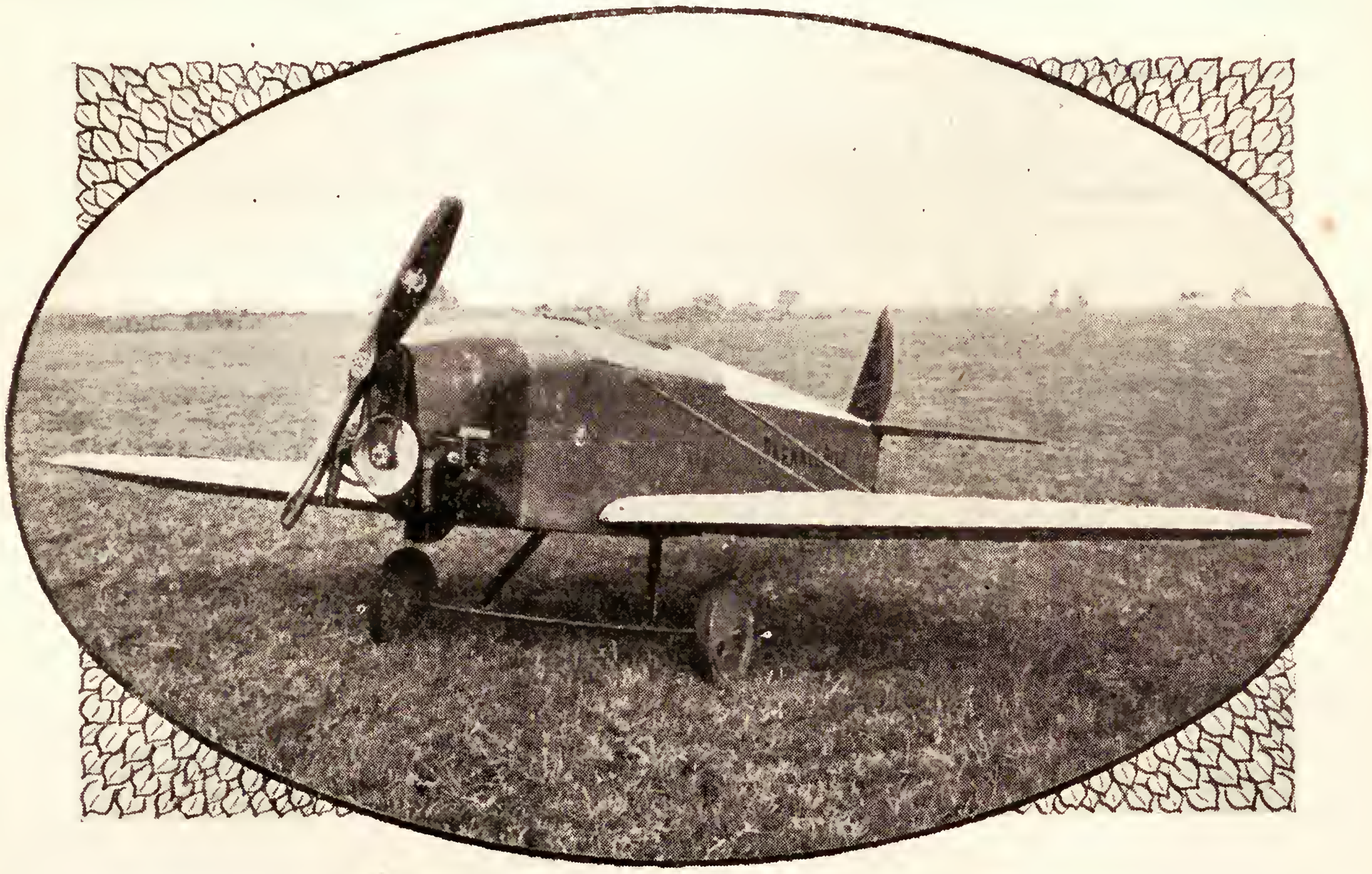

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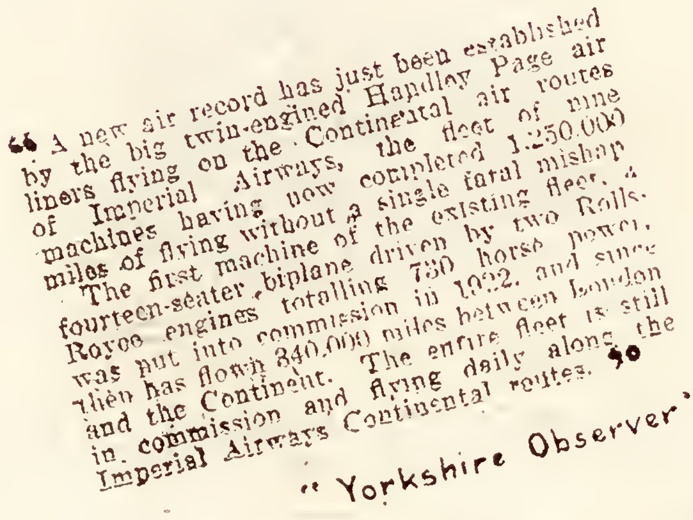

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IN PARLIAMENT

Royal Air Force and India

MR. KELLY, on November 29, asked the Under-Secretary of State for India the number of Indians employed in the Royal Air Force in India ; and whether there is any limitation as regards the capacity in which they are employed.

Earl Winterton : Royal Air Force units in India are in the same position as units of the British Army in that country, *i.e.*, they are units of the Imperial Forces and not part of the Indian Army. These units comprise no enlisted Indian personnel but, as in the case of British Army units, Indians are engaged as civilians for various duties. The number of Indians at present so employed is about 1,000.

West Indies Air Service

SIR H. BRITTAIN asked the Secretary of State for Air whether any efforts are being made at the present time to link up by seaplane service the islands of the West Indies ?

Sir Samuel Hoare : An Inter-Departmental Committee was recently appointed to explore the opportunities which may exist for the operation of civil air transport in the West Indies, and their report is now being studied.

Sir H. Brittain : Will the right hon. gentleman consider, as a start, forming a base at Georgetown, radiating in one way inland and on the other to Barbadoes and Trinidad ?

Sir S. Hoare : That is one of the questions which is being considered. The main question is one of money, and the obligations will fall mainly on the West Indies services.

Sir H. Brittain : These services will pay for themselves.

R.A.F. Fatal Accidents

COL. DAY, on December 1, asked the Secretary of State for Air the number of disasters resulting in loss of life to officers and men of the Royal Air Force during the 12 months preceding the last convenient date, stating the number of aircraft involved that were of War-time design and the number that were of post-War design respectively ?

Sir Samuel Hoare : During the 12 months ending November 22, 1926, there have been 54 fatal accidents in the Royal Air Force. Of these, 36 occurred on aircraft of types in service before the end of the War, and 18 on types brought into service after the War. The number of hours flown on machines of " War-time " design was, however, very much greater than that flown on machines of " post-War " design, and there is no ground for believing that the older types of machine still in use are more liable to accident than those of more modern design.

Accidents

MR. HAMMERSLEY asked what proportion of fatal accidents in the Air Force this year have been on machines of a type introduced before 1917 ?

Sir S. Hoare : Thirty-two per cent.

R.A.F. Recruits

COL. DAY asked the Secretary of State for Air the number of recruits enrolled into the Royal Air Force during each of the 12 months preceding the last convenient date ?

Sir S. Hoare : The following table gives the information requested by the hon. and gallant Member :—

Men.—1925 : November, 137 ; December, 60. 1926 : January, 47 ; February, 10 ; March, 23 ; April, 108 ; May, 21 ; June, 21 ; July, 6 ; August, 3 ; October, 2. Total, 438.

Apprentices.—1926 : January, 501 ; September, 508.

Apprentices are recruited by means of examinations which are held twice a year.

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The Royal Air Force Memorial Fund

THE usual meeting of the Grants Sub-Committee of the Fund was held at Iddesleigh House, Caxton Street, London, S.W.1, on December 2. Lieut.-Commander H. E. Perrin was in the Chair, and the other Members of the Committee present were :—Mrs. L. M. K. Pratt-Barlow, O.B.E., Mr. W. S. Field, Squadron-Leader Douglas Iron, O.B.E. The Committee considered in all 14 cases, and made grants to the amount of £76 4*s.* The next Meeting was fixed for December 16, at 2.30 p.m.

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THE DORNIER SUPER-WAL : This Dornier all-metal flying-boat, which is fitted with two Rolls-Royce " Condor " engines of 650 h.p. each, recently carried out some remarkable flights over Lake Constance, on one occasion carrying 55 passengers at 125 m.p.h. Our pictures show (top) the machine in flight over Lake Constance and (below) 50 of the passengers who went up together.

AIRCRAFT AND IMPERIAL DEFENCE

Speeches at the Imperial Conference

The texts of the speeches on the subject of Imperial Defence, made by Mr. Baldwin (On October 26) and the visiting Dominion Prime Ministers (On November 15), were published on December 2. We give below extracts from these speeches in so far as they concern the part played by aircraft.

Mr. Baldwin, in dealing with the subject of aircraft in Imperial Defence, referred to the danger to which this country, especially London, would be exposed in certain contingencies from air attack. He was, he said, glad to report that we were less anxious on this matter than we were in 1923. Nevertheless, as the countering or mitigation of such attacks was very difficult and required immense organization, in addition to the establishment and development of the Home Defence Air Force, we had been conducting a continuous investigation into the precautions of all kinds to be taken in the event of air raids, on which we had made considerable progress. We had also an Expert Committee inquiring into the question of anti-aircraft research. In addition, we had worked out a scheme of insurance against aircraft and bombardment risks in the light of war experience.

Mr. Mackenzie King, Prime Minister of Canada, who stated during the course of his speech tht the Canadian Government had, in 1922, decided to organise one department to contain the three Services and deal with all questions of Defence—said, in reference to aircraft, that before and during the Great War Canada had no Air Force of her own, although 10,000 Canadians served in the Aerial Forces of Great Britain in the war against Germany. Soon after the Armistice, in 1919, the organisation of a Canadian Air Force was commenced, and had proceeded gradually, and on April 1, 1923, the Royal Canadian Air Force was established on a regular military basis. The organization and training of this Force had followed closely that of the Royal Air Force, and very substantial progress had been made. Two training centres and six stations (three temporary, during the summer months) had been established in various parts of the country, so as to carry out the several duties of the Royal Canadian Air Force.

The Royal Canadian Air Force had made commendable advances in the civil side of its work. As he mentioned at a previous session of the Conference, immense areas were being surveyed annually, and millions of acres of valuable forest land protected. The work on the civil side was of such a nature that it provided practical training for the Air Force personnel. Civil aviation had a direct relation to the creation of a Military Air Force, and served to create a reserve thereto. By the Air Force Regulations an individual who obtained a pilot's certificate automatically became a Reservist.

The Prime Minister of the Commonwealth of Australia, Mr. Bruce, stated that the ordinary expenditure for the maintenance of Australia's local Defence Force—Navy, Army, and Air—now amounted to approximately £5,000,000 per annum, in addition to £5,000,000, spread over a period of five years, for development.

As regards Air Force development, the additional money which came out of the £1,000,000 special expenditure was for building and works generally, to provide additional personnel and equipment, and the training of the additional personnel for the establishment of new squadrons to be formed next year. Civil aviation, which linked with military aviation through the necessity of providing air bases, landing grounds, and other requirements throughout the whole of the Continent, was being dealt with by air route subsidies. In addition, they were doing a great deal of work in connection with the preparation of landing grounds and other requirements, and also the establishment of aeroplane clubs.

In addition to the £5,000,000 for development, special appropriations had been made since July 1, 1924, included in which, amongst other items, was a sum for the survey of the Great Barrier Reef, and £250,000 for the purchase of aircraft equipment, provision of Air Force accommodation, etc.

Mr. Bruce also pointed out that close co-operation existed between the Home and Australian services, Australian *liaison* officers being attached to the Admiralty, War Office and Air Ministry.

The Royal Australian Air Force during the current year would attain a strength of 1,200 officers and men. It was organised on precisely similar lines to the Royal Air Force, and its development would eventually provide for the necessary co-operation squadrons for the Fleet and for the Army, fighter, bombing, and reconnaissance squadrons, besides the ordinary training schools and experimental institutions.

The air training policy followed that of the Royal Air Force. Pilots for the permanent, short service, and Citizen Force were given the full flying course at the Flying School. Co-operation exercises were carried out with naval units as and when required. A flight of flying-boats was at present engaged in the naval hydrographic survey of the Great Barrier Reef. Army co-operation was provided at the annual training camps of artillery and infantry units, and from time to time when opportunity arose. In addition to the ordinary peace training, the Air Force carried out a considerable amount of survey and photographic work for the Navy, Army, Government and Municipal Departments. No attempt had been made so far to operate air routes for civil purposes with Service units. As arranged at the last Imperial Conference, an exchange of officers was instituted and was now in operation. Officers of the Australian Air Force were sent to England to the Air Staff College and other establishments. This year there were six officers under instruction in this country.

The Commonwealth Government had approved of the formation of aeroplane clubs, with the object of building up a reserve of pilots and airmen and to encourage aviation in Australia generally. Several clubs were in operation, and others were under consideration.

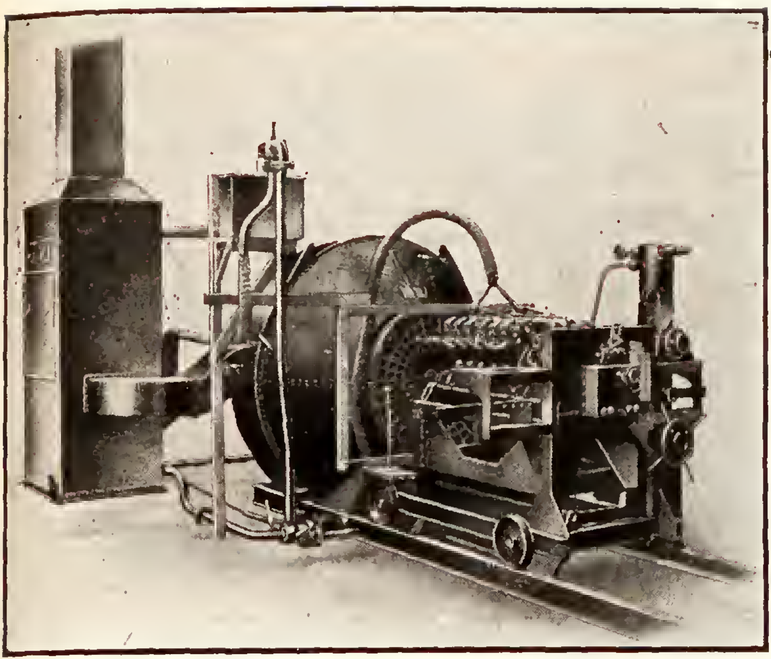
Mr. Bruce also referred to the survey flight to the South Pacific Islands. Orders were being placed for new aircraft and engines, and the whole of their service air units would be re-equipped with the most modern types in the course of the next three years. Their Air Experimental Section had undertaken the manufacture of aircraft on a limited scale, and several firms had engaged in re-conditioning aircraft, engines, and minor spare parts. Two civil aircraft firms were engaged in the local assembly of aircraft from parts which had been imported. There was every indication that local firms had gained sufficient experience to be in a position to commence manufacture of aircraft as soon as there were sufficient orders to justify the outlay required to undertake the work. Landing grounds were being established on strategical air routes, in addition to those prepared for civil aviation purposes. There were 134 aerodromes and landing grounds already acquired and maintained.

Mr. Coates, Prime Minister of New Zealand, who agreed that the importance of the air arm was definite, said, concerning air policy, that New Zealand was anxious to continue her development on lines which were co-operative with Great Britain and possibly with Australia, but any commercial development which they might be able to effect must of necessity be slow, and with due regard to what took place in other parts of the Empire, as they were at the end of a long line and over 1,000 miles of stormy weather and sea separated their centres of population from Australian cities.

Regarding development of the fighting Air Service, he felt that their geographical position to a great extent governed their policy, though co-operation by the Air arm with the Military and Naval Forces of the Dominion, both for local defences or overseas expeditionary work, was always kept in view.

Mr. Havenga, on behalf of the Union of South Africa, stated it was their air and land forces which, from the South African standpoint, were most important to them to-day, and, in case of a war in which the Union was participating, it was with these that they should be able to render most effective assistance. Their policy was to maintain an Air Force in South Africa primarily for internal security, ready to act instantly, as a striking force and to hold and restrict any serious disturbance of the peace during the period that the Citizen Forces of the country were being mobilized and brought into action. It was concentrated at Pretoria, and its mobility was ensured by aerodromes and landing grounds throughout South Africa. One squadron could operate at any point in the Union within one day. It was organized and trained on the same lines as the Royal Air Force, thus ensuring easy co-operation with the rest of the Air Forces of the Empire.

In connection with the demonstration flights from Cairo to Cape Town, to which reference was made in the Committee of Imperial Air Communications, their advisers had worked out with the Air Ministry most of the details of the flights and



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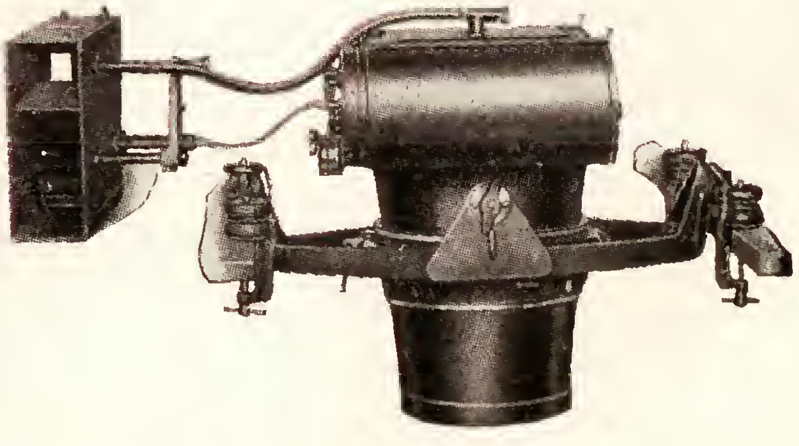

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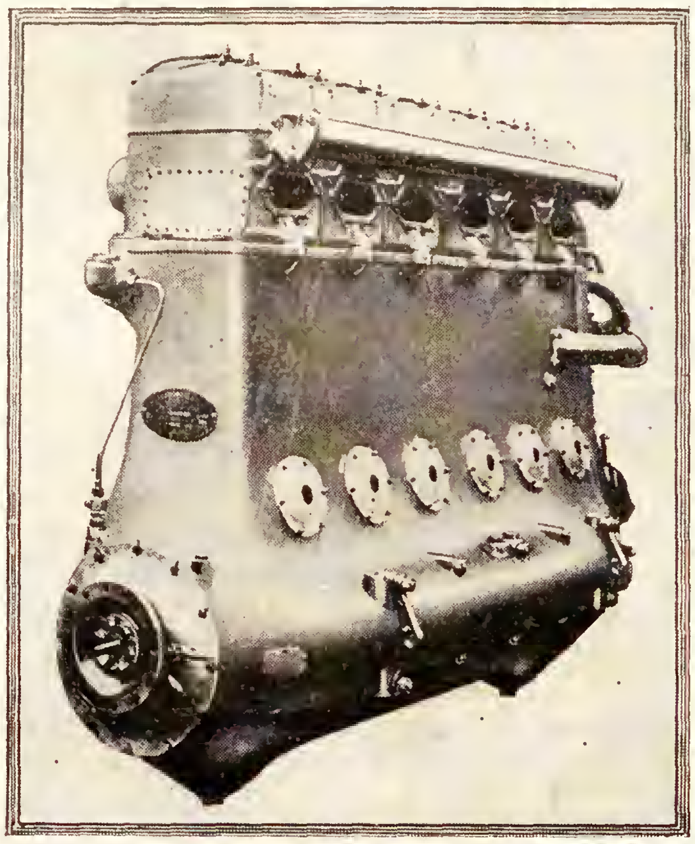

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had arranged that the Royal Air Force machines which would fly from Cairo next year, would combine with their Air Force in the programme of active citizen training at their annual camps at Potchefstroom and Cape Town in the beginning of April next. This small measure of co-operation represented a beginning of the closer air co-operation to which they were looking forward. The South African Government were extremely grateful for the invaluable assistance received from the Royal Air Force, who had unstintingly placed the results of their researches and the labours of their training and organization staffs at their disposal.

They realized and accepted the views held that, where expenditure did not matter, the ideal method of coastal defence was a combination of aircraft and fixed defences. It did not appear possible, without weakening either branch to the point of ineffectiveness, to bring about this ideal combination in South Africa and at the same time keep the expenditure within their resources. They felt that the present strength of their Air Force was a very bare insurance cover. The employment, therefore, of aircraft on coastal defence would enormously enhance the strength of their Air Force, as such coastal aircraft could be utilized equally well for military operations inland in any purely local emergency.

He wished, therefore, to take this opportunity of putting forward a suggestion in the following concrete form :—That the Committee of Imperial Defence may be asked to review the policy of South African Coastal Defence, and, on the assumption that in the near future it would be necessary to re-arm some of the South African coastal defences and perhaps to increase the defences at certain ports, and, in view of the probable nature and scale of attack against South Africa, to consider whether aircraft could not be more efficiently and economically employed for that purpose. Further, to take into special consideration the enormously enhanced internal security which this increase in the strength of the South African Air Force would give, and the additional advantages of (1) coastal reconnaissance, including convoy work and anti-submarine patrols ; (2) air co-operation with the Africa Squadron, Royal Navy, in gunnery and strategic exercises, and increased co-operation with Army coastal units ; and (3) possible employment on coastal and fishery survey. [This suggestion was accepted by the Prime Minister of Great Britain, on behalf of the Committee of Imperial Defence.]

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THE ROYAL AIR FORCE

London Gazette, November 30, 1926.

General Duties Branch

Flying Officer R. S. Blucke is granted a permanent commission in rank stated (Nov. 1). The following Pilot Officers are promoted to rank of Flying Officer :—P. V. Williams, L. T. Pankhurst (Oct. 14) ; L. A. Walsh (Oct. 17) ; T. H. Perry-Keene, H. R. Bardon, I. G. E. Dale (Oct. 31). Pilot Officer on probation M. A. Smith is confirmed in rank (Oct. 20) ; Flight-Lt. R. Pyne, D.F.C., is seconded for service as Aide-de-Camp to the Governor of the United Provinces (Nov. 1) ; Flight-Lt. E. W. Simpson is granted permission to retain rank of Squadron Leader on transfer to Reserve (Oct. 24) ; Flying Officer G. J. Stroud, M.B.E., is placed on retired list at his own request and is granted permission to retain the rank of Flight-Lt. (Dec. 1).

The following are transferred to the Reserve :—CLASS A. : FLYING OFFICERS.—F. S. Henderson, G. Terrell (Nov. 27) ; C. A. Goatcher (Nov. 28).

CLASS C. : FLIGHT LTS.—H. L. Nunn, D.S.C., D.F.C., A. J. Nightingale (Nov. 28).

Flying Officer A. R. Braybrooke (Lt. K. Shrops. L.I.) relinquishes his temporary commission on resigning his commission in the Army (Nov. 27).

Stores Branch

Flying Officer R. A. Dolton resigns his short service commission (Dec. 1).

Medical Branch

Flight-Lt. G. R. Hall, M.D., relinquishes his temporary commission on ceasing to be employed (Oct. 8).

Reserve of Air Force Officers

L. S. Ash is granted a commission in Class A. General Duties Branch, as a Pilot Officer on probation (Nov. 30) ; Pilot Officer on probation A. F. Waghorn is confirmed in rank (Nov. 30). The following relinquish their commissions on completion of service :—Flight-Lt. A. Roberts (Oct. 24) ; Flying Officer C. St. C. Parsons (Nov. 20).

Medical Branch

W. G. Weston, M.B., is granted an honorary commission as a Flight Lt. (Nov. 30).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :

Accountant Branch

Squadron-Leader : E. N. E. Waldron to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 4.11.26.

Flight-Lieutenants : O. K. Griffin to Station H.Q., Duxford, 25.11.26. I. L. Wincer to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 4.11.26.

Flying Officers : C. B. Rawlins to R.A.F. Depot, Uxbridge, 23.11.26. J. L. Armstrong to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 4.11.26. F. R. Barton to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.10.26.

Flying Officer F. Rigby, to No. 99 Sqdn., Bircham Newton, 9.12.26.

Medical Branch

Group Captain H. V. Wells, C.B.E., to R.A.F. Depot, Uxbridge, pending posting on transfer to Home Estabt., 4.11.26.

Squadron-Leaders : E. W. Craig, M.C., M.B., to H.Q., Mediterranean, 16.11.26. J. Kyle to Air Ministry (Directorate of Med. Services), 16.11.26.

Squadron-Leader E. A. Lumley, M.C., M.B., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26.

Flight-Lieutenants : (Hon. Sqdn.-Ldr.) W. R. Reith, M.D., A.M., to R.A.F. Depot, Uxbridge, 15.11.26. E. C. K. H. Foreman to Station H.Q., Bircham Newton, 22.11.26. J. D. Leahy, M.C., M.B., B.A., and F. W. G. Smith, M.B., B.A., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 17.10.26. L. P. McCullagh, M.B., to R.A.F. Depot, Uxbridge (Non-effective Pool), on transfer to Home Estabt., 17.10.26.

Flight-Lieutenant (Dental) J. R. Williams to H.Q., Halton, on appointment to a temp. commn., instead of to H.Q., Cranwell, as previously notified, 2.11.26.

Flying Officers : H. C. Patterson to R.A.F. Depot, Uxbridge (Non-effective Pool), on transfer to Home Estabt., 17.10.26. J. O. Priestley, D.M.R.E., to R.A.F. Hospital, Cranwell, 24.11.26.

Squadron Leader R. W. Ryan, M.B., to H.Q., Egypt, 15.11.26.

Flight Lieutenants : T. Sheehan, to R.A.F. Training Base, Leuchars, 29.11.26. A. E. Jenkins, to Station H.Q., Bircham Newton, 29.11.26. E. C. K. H. Foreman, to R.A.F. Station, Tangmere, 3.12.26.

Flying Officers : R. A. W. Kerr, M.B. and E. Thompson, to Research Lab. and Med. Officers' Sch. of Instruction, for short course, on appointment to Short Service Commissions, 22.11.26. G. S. Strachan, M.B., to R.A.F. Station, Duxford, 1.12.26.

General Duties Branch

Wing Commander : W. C. Hicks, A.F.C., to R.A.F. Depot, Uxbridge, Supernumerary, pending posting on transfer to Home Estabt., 25.10.26.

Squadron Leader : B. F. Moore, to No. 5 Flying Training Sch., Sealand, 7.12.26. E. B. Beauman, to R.A.F. Base, Malta, 23.11.26. C. N. Lowe, M.C., D.F.C., to No. 6 Armoured Car Co., Iraq, 1.11.26.

Flight Lieutenant : A. F. James, to No. 5 Flying Training Schl., Sealand, 4.12.26. C. J. S. Dearlove, to No. 30 Sqdn., Iraq, 1.11.26. T. S. Horry, D.F.C., to No. 70 Sqdn., Iraq, 22.10.26. M. M. Freehill, D.F.C., to No. 55 Sqdn., Iraq, 1.11.26. G. Archer, to No. 503 Sqdn., Waddington, 23.11.26. T. Henderson, M.C., A.F.C., to No. 6 Armoured Car Co., Iraq, 28.10.26. R. E. G. Fulljames, M.C. and J. A. G. Haslam, M.C., D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.10.26.

Flying Officers : A. E. Rogenhagen, to No. 56 Sqdn., Biggin Hill, 7.12.26. F. E. R. Dixon, M.C., to No. 3 Stores Depot, Milton, 3.12.26. E. R. C. Hobson, D.F.C., to No. 216 Sqdn., Egypt, 4.11.26. J. R. Brown, D.F.C., to No. 6 Sqdn., Iraq, 17.9.26. D. A. Boyle, to No. 6 Sqdn., Iraq, 1.11.26. L. S. Birt, to No. 84 Sqdn., Iraq, 1.11.26. A. T. S. Studdert, to No. 30 Sqdn., Iraq, 1.11.26. S. F. Coleman, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.10.26. C. J. A. Delany, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.10.26. C. H. A. Farnan, to Central Flying Sch., Wittering, 15.12.26.

Pilot Officer P. V. Williams to No. 503, Sqdn.. Waddington, 23.11.26.

Stores Branch

Squadron Leaders : F. Grave, M.B.E., to H.Q., Cranwell, 7.12.26. J. S. Goggin, to H.Q., Inland Area, Stanmore, on transfer to Home Estabt., 6.12.26.

Flight Lieutenant : T. S. James, to H.Q., Cranwell, 27.11.26. C. M. Bevan, to H.Q., India, 6.11.26. C. H. Pownall, to Aircraft Depot, India, 6.11.26. A. G. Knight, M.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.10.26.

Flying Officers : E. A. Burridge, to Sch. of Balloon Training, Larkhill, 23.11.26. F. W. Todd and C. W. Rugg, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.10.26.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty :—

Lieut.-Commr. (Flying Officer, R.A.F.) R. H. Portal, to *Furious* and for full flying duties in 462 flight, 22.10.26.

Lieutenant (Flying Officer, R.A.F.).—A. G. Elliott, to *Eagle*, and for full flying duties in 460 flight, in command, 15.10.26.

Lieuts. (Flying Officers, R.A.F.).—H. R. M. Nicholl, C. R. V. Pugh and A. N. Waring, to *Vindictive*, and for No. 444 Flight, 19.11.26.

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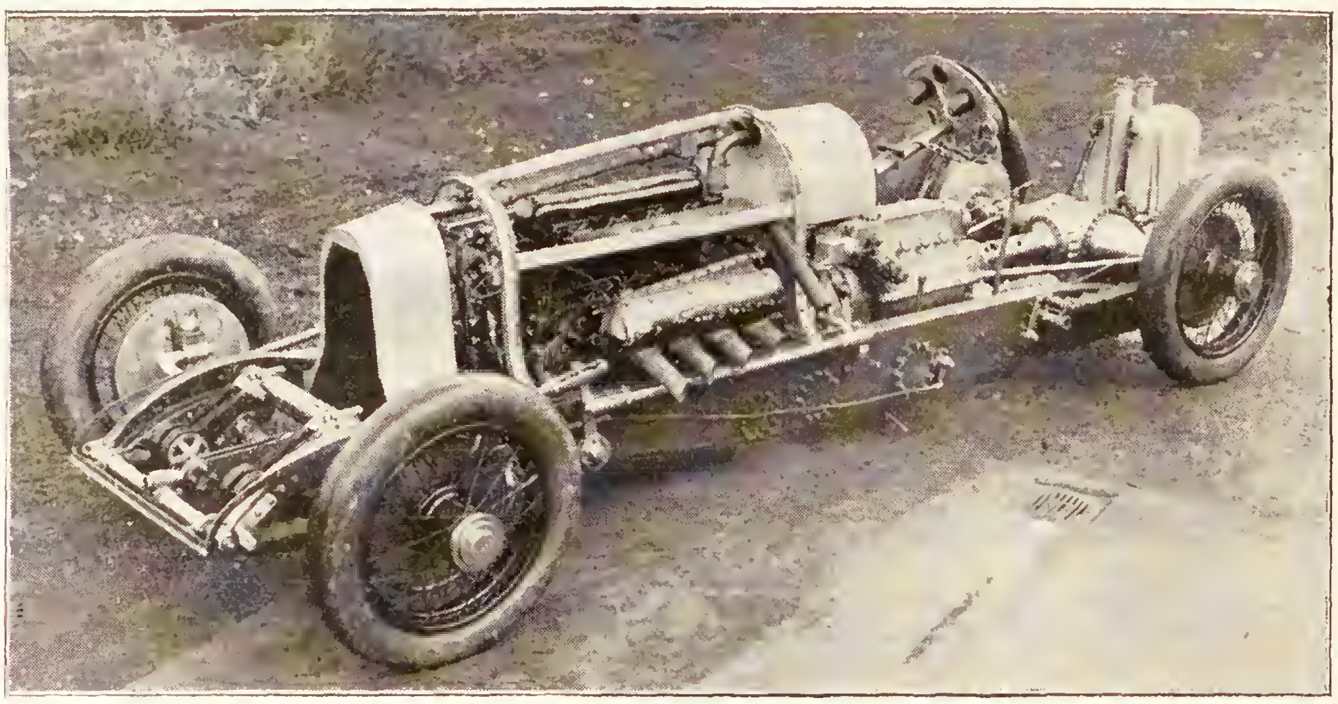
ROYAL AIR FORCE, MARTLESHAM "ANNUAL"

For the sixth year in succession, at the invitation of Wing Commander H. Blackburn, M.C., A.F.C., and the officers, Royal Air Force, Martlesham Heath, a number of the constructors and other friends, participated on December 3, in a very enjoyable evening in the officers' mess, following generous administration to the inner man.

◆ ◆

The popularity and hospitality of the Martlesham unit are so great that the accommodation and efforts of the *cuisine* for the hundred (more or less) of those present was tested to the utmost, but with most satisfactory results. An artistic menu, specially designed at the Station, was a feature, and "signing" thereon under "Who's Who" was a pastime which kept the guests and hosts busy after the King had been duly honoured.



An aero engine in a motor car: from this three-quarter view of the chassis of the Napier ("Lion")-Campbell racing car a general idea of the lay-out can be obtained.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS (S.M.A.E.)

A meeting took place at Headquarters (Central Y.M.C.A. Tottenham Court Road, W.) on December 3, at which Mr. C. A. Rippon read a paper on Farman type models, a subject in which he has specialised for many years now. The paper was full of interest, and was well illustrated by diagrams and photographs—a recent model with Bowden transmission gear also being exhibited. The full text will be published in the S.M.A.E. Journal.

On December 17 (7.30 p.m.) at Headquarters, a further meeting will take place, the following items being down for this date.

(1) "Speed Models," by R. N. Bullock.
(2) Sale of anything appertaining to aero model work, the proceeds to go to the club's funds.

It is hoped that all members will make an effort to be present on this occasion, as the paper on "Speed" should prove of especial interest. Non-members are also cordially invited, as the material and accessories which will be sold, following the paper, are likely to be of considerable use to all those interested in model aviation.

The Schoolboys' Exhibition, at which the Society will be represented, is to be held at the Royal Horticultural Hall (Vincent Square, S.W.) from January 1 to January 7, inclusive. Will members kindly note that models must be at the Hall on Friday evening, December 31, when our stand will be arranged.

B. K. Johnson, *Hon. Secretary.*

⁂ ⁂ ⁂ ⁂

City of London Bombing Squadron

Capt. Guest, M.P. (who was Secretary of State for Air in 1921-22) has been appointed Squadron-Leader of No. 600 (City of London, Bombing) Squadron, Auxiliary Air Force. This squadron, which has its headquarters at Finsbury Barracks, together with No. 601 (County of London, Bombing) Squadron, will have the flying quarters transferred from Northolt, Uxbridge, to Hendon.

R.A.F. Examinations

The Civil Service Commissioners announce that open competitive examinations for the entry of (1) aircraft apprentices and (2) apprentice clerks into the Royal Air Force will be held in Belfast, Birmingham, Cardiff, Chatham, Edinburgh, London, Plymouth, and Portsmouth on April 22, 1927. The limits of age are :—Aircraft apprentices, 15-17 on July 1, 1927; apprentice clerks, 15½-17, July 1. 1927. Forms of application, etc., will be sent in response to requests received by letter addressed to the Secretary, Civil Service Commission, Burlington Gardens, London, W.1.

Governor-General of Australia's Flight

On December 2 Lord Stonehaven, Governor-General of Australia, flew from Melbourne to Broken Hill in nine hours.

Swedish Air Collision

Two Swedish aeroplanes came into collision at the military aerodrome at Malmslatt on December 1 when carrying out manœuvres at an altitude of about 1,500 ft. The pilot of one of the machines was killed.

PUBLICATIONS RECEIVED

Conquering the Air. By Archibald Williams. Thomas Nelson and Sons, Ltd., Edinburgh, and Paternoster Row, London, E.C. Price 6*s.*

Commercial Air Transport. By Lieut.-Col. Ivo Edwards, C.M.G., and F. Tymms, M.C. Sir Isaac Pitman and Sons, Ltd., 39-41, Parker Street, London, W.C.2. Price 7*s.* 6*d.* net.

The Anodic Oxidation of Aluminium and its Alloys as a Protection Against Corrosion. Department of Scientific and Industrial Research. H.M. Stationery Office, Kingsway, London, W.C.2. Price 1*s.* 3*d.* net.

Aeronautical Research Committee Reports and Memoranda: No. 1028 (*M.*43).—Report on Study of Mechanical Properties of Silicon-Aluminium Alloys. Parts I and II. By J. D. Grogan. June, 1926. Price 1s. net. *No.* 1042 (*A.*4).—An Investigation on Wing Flutter. By R. A. Frazer. February, 1926. Price 1*s.* net. H.M. Stationery Office, Kingsway, London, W.C.2.

Transactions of the Institution of Engineers and Shipbuilders in Scotland. Vol. LXIX. Sixty-Ninth Session, 1925-26. The Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow.

⁂ ⁂ ⁂ ⁂

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1926

Published December 9, 1926

2,820. A. Weingarten. Method of manufacture of framework supports for aeroplane wings. (249,821.)
21,728. D. Napier and Son, Ltd., and R. Hutchinson. Cylinders for i.c. engines. (261,318.)

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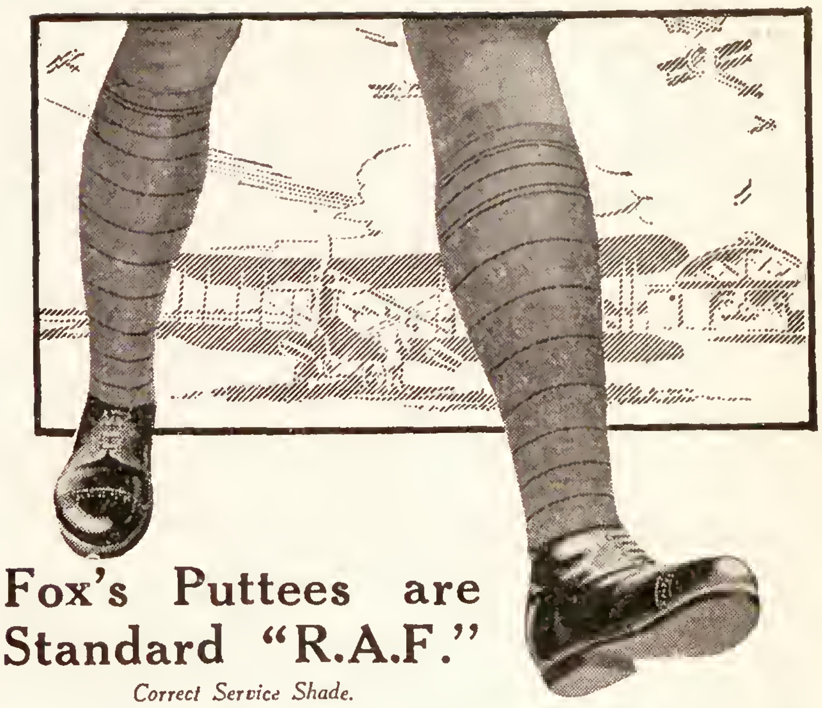

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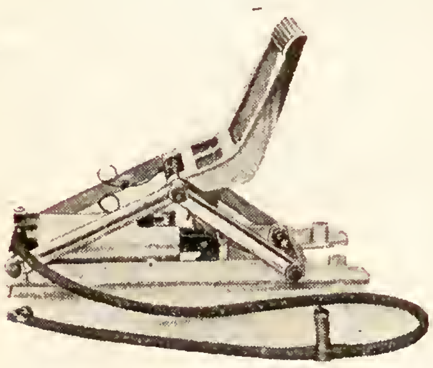

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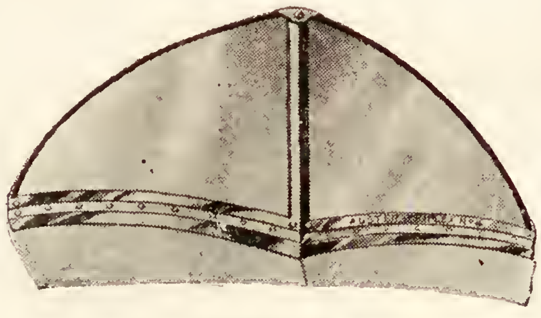

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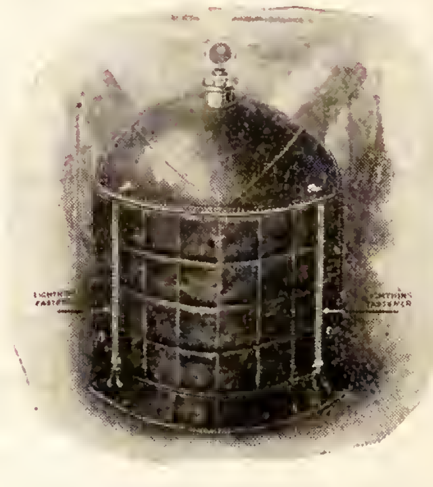

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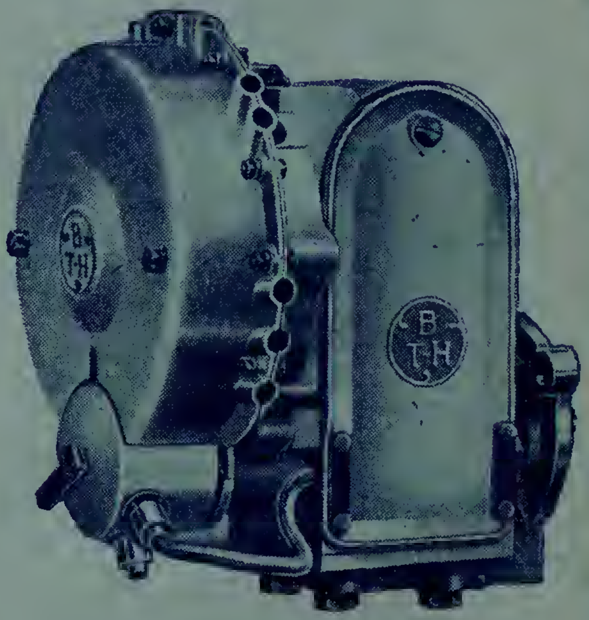

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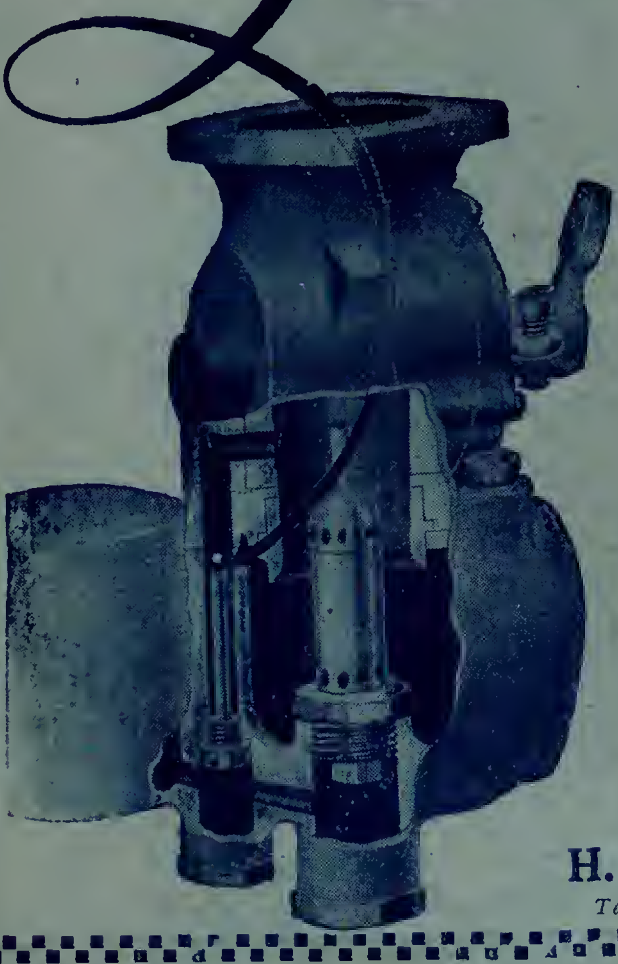

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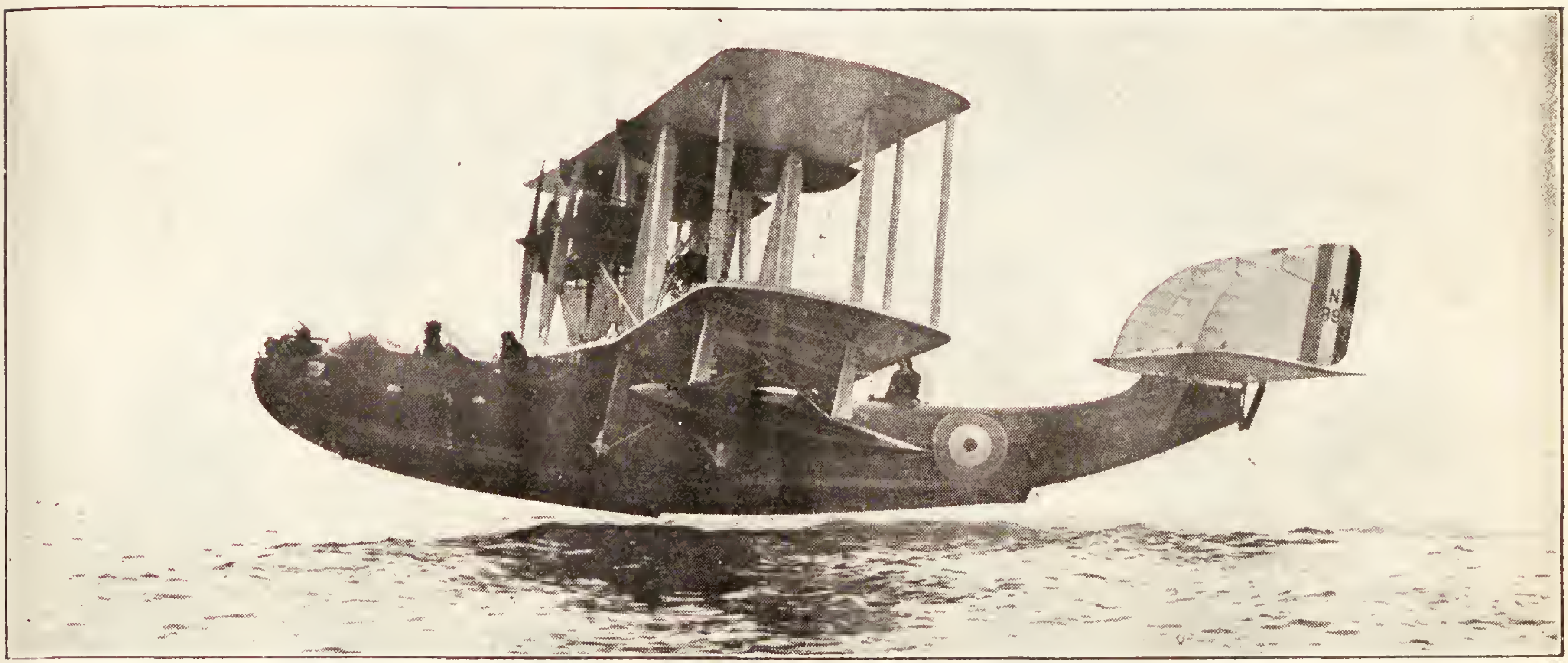

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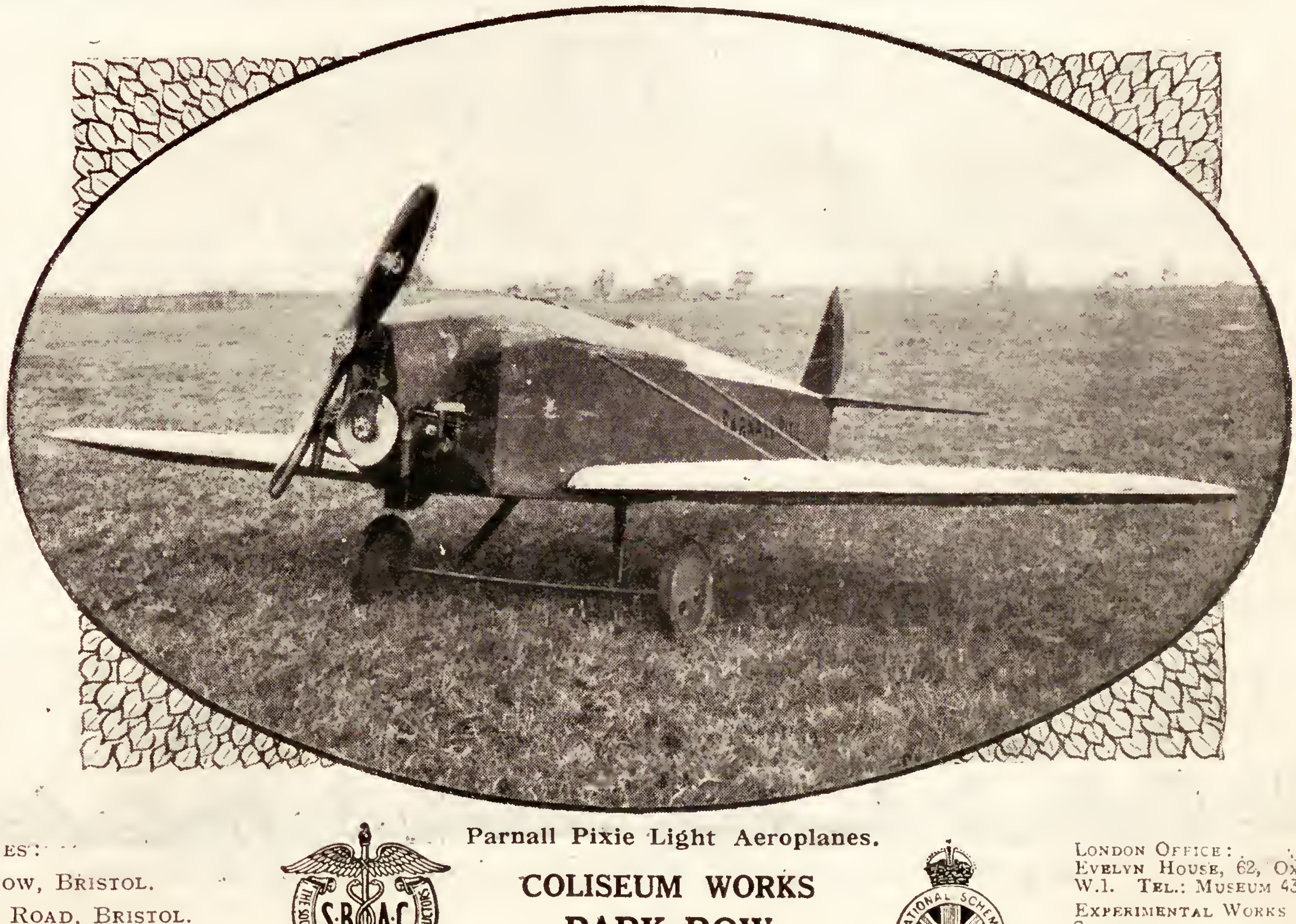

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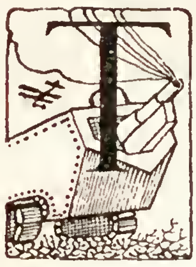
DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Dec. 3-19	**Paris Aero Show**
Dec. 16	**Wing-Comdr. C. D. Breeze, A.F.C., R.A.F. " The Training of Aircraft Apprentices," before R.Ae.S.**
1927	
Jan. 13	**Professor F. C. Lea, D.Sc., M.Inst.C.E., M.I.Mech.E. " Some Experiments on the Effects of Repeated Stresses on Materials," before Inst.Ae.E.**

EDITORIAL COMMENT.



THE decision of the Air Council to publish, from H.M. Stationery Office, the Memorandum by the Secretary of State for Air laid before the Imperial Conference, 1926, together with the Report of the Imperial Air Communications Special Sub-Committee, will be welcomed by all who believe in the urgent necessity of, as Sir Samuel Hoare has often expressed it, " making the Nation 'air-minded.' "

Imperial Air Communications

The publication, which bears the title " The approach towards a System of Imperial Air Communications," was issued yesterday, December 15, and there has thus been but little opportunity for a detailed study of it. It is thought, however, that a brief reference to it this week may be acceptable to our readers, many of whom will, doubtless, wish to purchase for themselves a copy of the Memorandum, which contains a sheaf of maps and illustrations, and forms probably the most detailed review of civil aviation that has ever been prepared in any country, embracing as it does, the civil air activities of the whole world.

Before commenting upon the various sections of the publication in question it may be of assistance to give a very brief summary of the contents. The first section gives the report of the special Sub-Committee on Imperial Air Communications set up by the Imperial Conference. Then follows the statement on Imperial Air Communications made to the Imperial Conference by Sir Samuel Hoare, Secretary of State for Air. The text of the Memorandum laid before the Imperial Conference by Sir Samuel Hoare is given in full, and occupies the greater part of the publication.

In the report of the Sub-Committee on Imperial Air Communications it is stated that the sub-committee are convinced that the development of Imperial air communications, both by airship and aeroplane, is of sufficient importance to merit the early and continuous attention of the Governments of the several parts of the Empire, and accordingly the sub-committee recommends that the Imperial Conference notes with satisfaction the prospective opening of a regular air service between Cairo and Karachi and of an experimental service between Khartoum and Kisumu; also the decision of the British and South African Governments to carry out a series of experimental flights to connect as far as possible with the latter service; and the decision of the Australian Government to arrange for flights by the Royal Australian Air Force from Australia towards Singapore to link up with similar flights of the Royal Air Force from Singapore towards Australia. The Imperial Conference recommends that the development of other air services should receive the early consideration of the Governments concerned, and that in this connection particular attention should be paid to the maintenance of existing, and the construction of new, aerodromes as far as local resources permit, with a view to the ultimate creation of a complete system of Empire air routes.

In view of the great potentialities of the airship and the present lack of constructional and other facilities it is recommended that the Governments of the Dominions concerned and India should examine the possibility of erecting nucleus mooring-mast bases to be available for demonstration flights in 1928-29 by the two airships now under construction, and of instituting such preliminary meteorological investigations as may be necessary to facilitate these demonstration flights; and that His Majesty's Government in Great Britain should consider the erection of a second shed at the Royal Airship Works at Cardington.

It is further recommended that an Imperial Air Conference should be held in 1928 or 1929 at some suitable Imperial centre, to report progress and to consider what further action can be taken for the development of Imperial air communications. The conference notes with appreciation the invitation of the Dominion of Canada that this conference should take place in Canada.

Finally, the sub-committee expresses the opinion that the present system of communicating information in regard to civil aeronautics should be continued, and that exchanges should be made from time to time between the civil aviation officials of Great Britain and the Dominions and India, as far as the limitations of staff and local considerations permit. The recommendations made in the report of the sub-committee were unanimously adopted by the Imperial Conference at its fifteenth meeting on November 19, 1926.

The statement on Imperial Air Communications made to the Imperial Conference by Sir Samuel Hoare has already been given in abbreviated form in FLIGHT.

The Memorandum by Sir Samuel Hoare, under the title "The Approach towards a System of Imperial Air Communications," deals in four sections, with the rise of air transport during the years 1920–26, the first Imperial aeroplane services, progress towards the establishment of Imperial airship services, and the future of Imperial air transport. Six appendices contain information of a very detailed nature relating to the aeroplane transport development of the principal nations; the regulation and administration of civil aviation; aeroplane transport operating costs; the organisation of the cross-Channel aeroplane services; notes on the organisation of airship services; and some special uses of aeroplanes.

The statistics contained in this volume, and particularly in the appendices, provide fascinating reading. Unfortunately there has not been sufficient time in which to go through these, much less to consider their significance, for us to be able to comment on them in this week's issue of FLIGHT. We hope to return to the subject in detail in subsequent issues.

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Airships The subject of airships in connection with Imperial air communications forms a fairly large proportion of Sir Samuel Hoare's Memorandum, and even a cursory glance through the publication appears to indicate the importance attached by governments to this branch of civil aviation. FLIGHT has, on the subject of the new five million cubic foot airships, expressed some doubt in the past as to the wisdom of launching out with such an ambitious programme, and we have pointed out that Great Britain's previous experience of airship design and construction was barely sufficient to make the undertaking of building airships of this size more than a gigantic experiment. We have also repeatedly pointed out the need for the very greatest caution, and for as thorough experimentation as the time and capital available would allow. In this connection the statement made in Sir Samuel Hoare's Memorandum under the heading "The Progress of the Experimental Programme, 1924–26," is fairly reassuring. The statement points out that "work under the experimental programme has now been proceeding for about 18 months, and that the varied and complicated problems of airship construction and operation have been approached by a cautious and scientific method, and that a considerable amount of practical progress has been made. Important investigations into the principles of airship construction have been carried out and submitted successfully to the test of full-scale experiment." So far so good. What the Memorandum does not point out, but which is by now a secret known to everyone, is that the constructional work has been handed over to a private firm which already had established a very high reputation for its work on all-metal (and more particularly all-steel) construction of aeroplanes. It is believed that this firm has been given a fairly free hand, and although one may not go into detail at the moment, we personally regard this fact as a happy augury. A thorough knowledge of the constructional material—in this case steel—its treatment, peculiarities and application is an essential factor in the equation of success, and the fact that the firm in question has the entire handling of the steel, from the raw material to the finished components, should make for that close co-operation between design office and shops which is so important in all engineering but probably nowhere more so than in the case of a new airship of a somewhat experimental character.

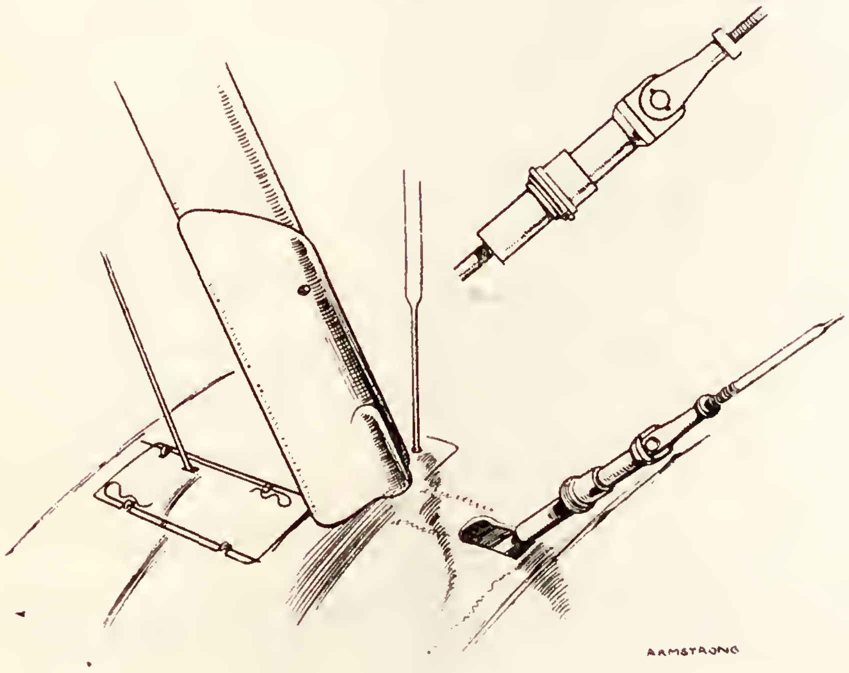
The Memorandum admits that much yet remains to be done, but one can at any rate agree cordially with the remarks of the Secretary of State for Air when he concludes this section of his Memorandum by saying: "When this experimental programme has been successfully completed there can be no doubt that airship design and construction will have been placed upon an entirely new and more practical basis; and the way will then be clear for carrying out the further experiments which are required to establish the practicability of regular airship operation throughout the Empire."

The PARIS AERO SHOW 1926

In the issue of FLIGHT, *dated December 2, 1926, we published an advance report dealing with the aircraft exhibited at the Tenth International Aero Exhibition at Paris, the report being illustrated by photographs and drawings. Except in one or two cases (where machines failed to arrive, or where a type was shown different from that which it had orignally been intended to exhibit) our advance report proved correct, and formed a useful guide to the exhibits of the various French and foreign aircraft firms. Our first report was devoted mainly to specifications of the machines, the purpose for which they were designed, their main dimensions, weights, etc., and their performance. Constructional features were not dealt with at any great length, it being considered preferable to defer a critique of these until our representatives had had an opportunity of examining the machines in detail and obtaining photographs of the more interesting ones, as well as sketches of such constructional details as appeared likely to be of interest, sometimes on account of their merit or in some cases otherwise. In the space which can be devoted to the Paris Show machines it is not possible to publish a detailed description of every machine, nor would such a description necessarily be of any particular value In the following notes, however, attention is called to some of the outstanding features of the more interesting machines. Those wishing to compare performances with the structural design of any given aeroplane are requested to refer to our December 2 issue, since lack of space prevents us from repeating the performance data in the present issue.*

ARMSTRONG-WHITWORTH

The sole representative of Great Britain at the Paris Aero Show, as far as aircraft is concerned, fell a victim to French methods of transport, having been sent in its packing case instead of by air. It might be asked why the machine was not flown over, as it might very easily have been. The reply to that is that, after leaving the Grand Palais, the "Ajax" is going farther afield, to a destination which seemed to be known to everyone at the show, but which is not to be made public in cold print. As a packing case had to be made for the machine for its journey onwards from Paris, it was thought that it might as well go to Paris in its case, and thus preserve its finish untarnished. To all appearances there was ample time for it to reach the show before the opening day, but fate had decreed otherwise, and the "Ajax" made a somewhat belated appearance. Exactly how it arrived we were never able quite to discover. When visitors left the Grand Palais one evening the Armstrong-Whitworth stand was empty, and when the doors were opened the next morning the machine stood there looking as innocent as if it had been there the whole time. Probably Mr. Proctor and his assistants could throw some light on the subject if they chose, and certainly the task of getting the machine in overnight, getting it erected, and tidying up the stand must have meant hours of hard



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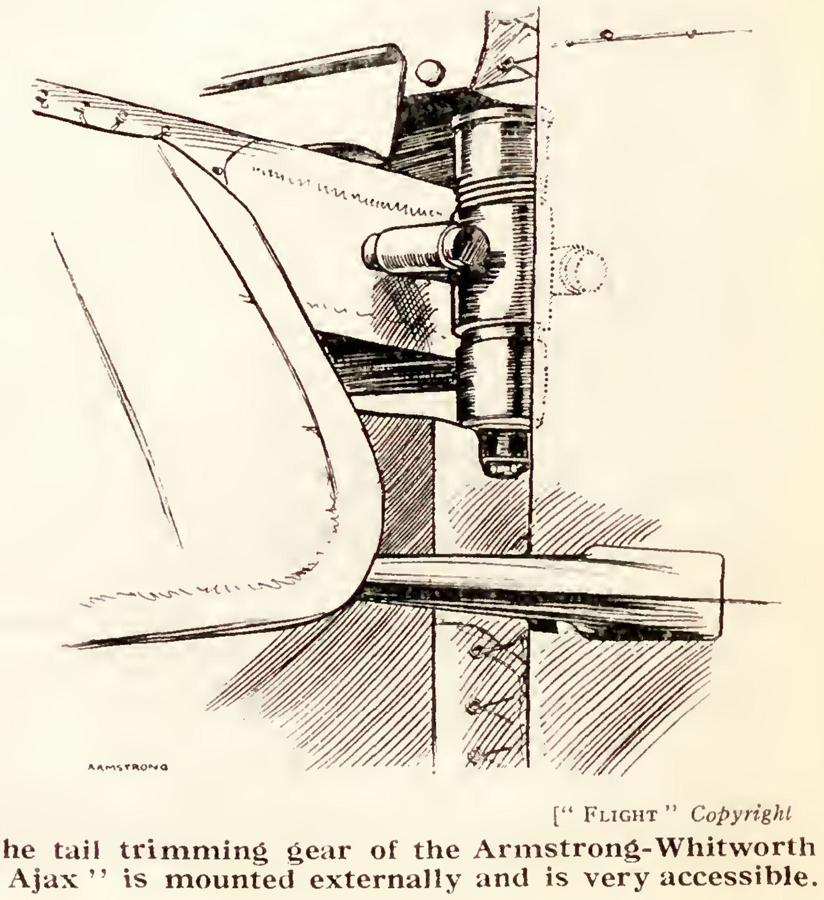
ON THE ARMSTRONG-WHITWORTH "AJAX": Spring-loaded turnbuckles are incorporated in the landing wires so as to keep them taut under all conditions. The strut attachment is neatly faired in by an aluminium sleeve held in place by a split pin.



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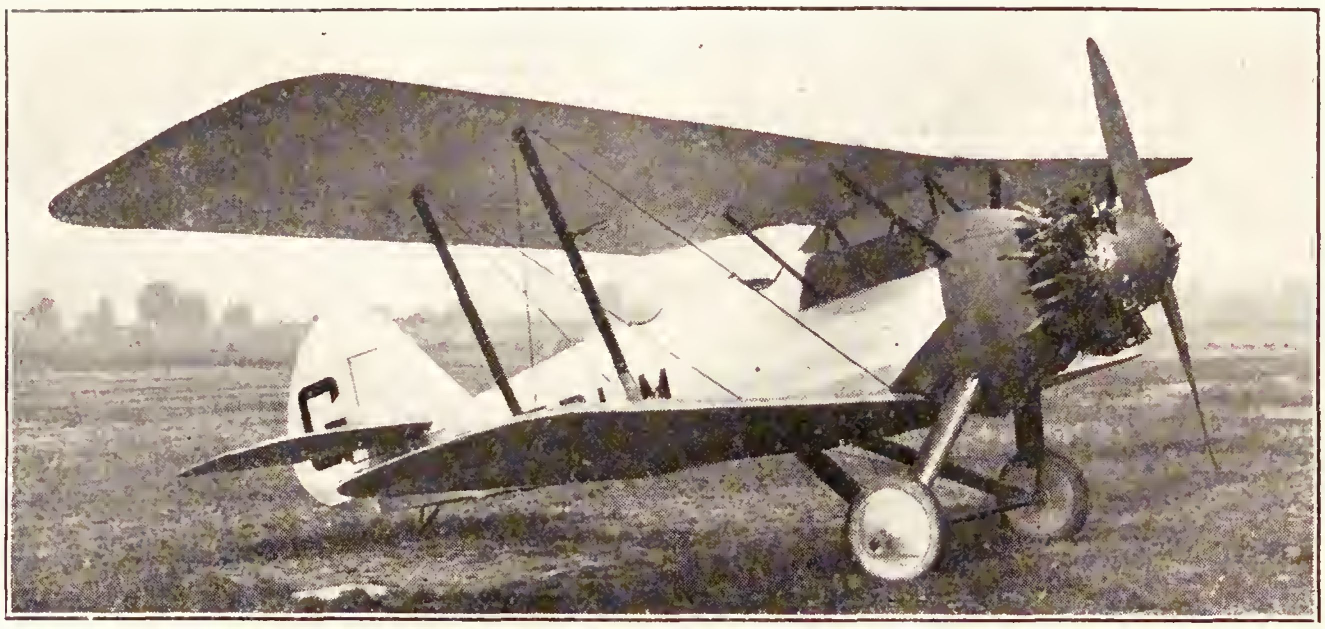
The tail trimming gear of the Armstrong-Whitworth "Ajax" is mounted externally and is very accessible.

Britain's sole representative: The Armstrong-Whitworth "Ajax" with Armstrong-Siddeley "Jaguar" engine.



work under great difficulties. The main point is that the "Ajax" did arrive, and we are not at all certain that it did not get a great deal more attention by its late arrival than it might have done otherwise. At any rate for the first two or three days it received visits from a very large number of people, not only visitors to the show but also exhibitors, who were somewhat naturally keenly interested in the only example of British aircraft design and construction. That the machine created a very favourable impression cannot be doubted, and without being accused of bias in the matter we can say that the "Ajax" compared favourably with other machines in its class, its small size, compact lay-out, and generally clean appearance being such as to stand out in marked contrast to many other machines.

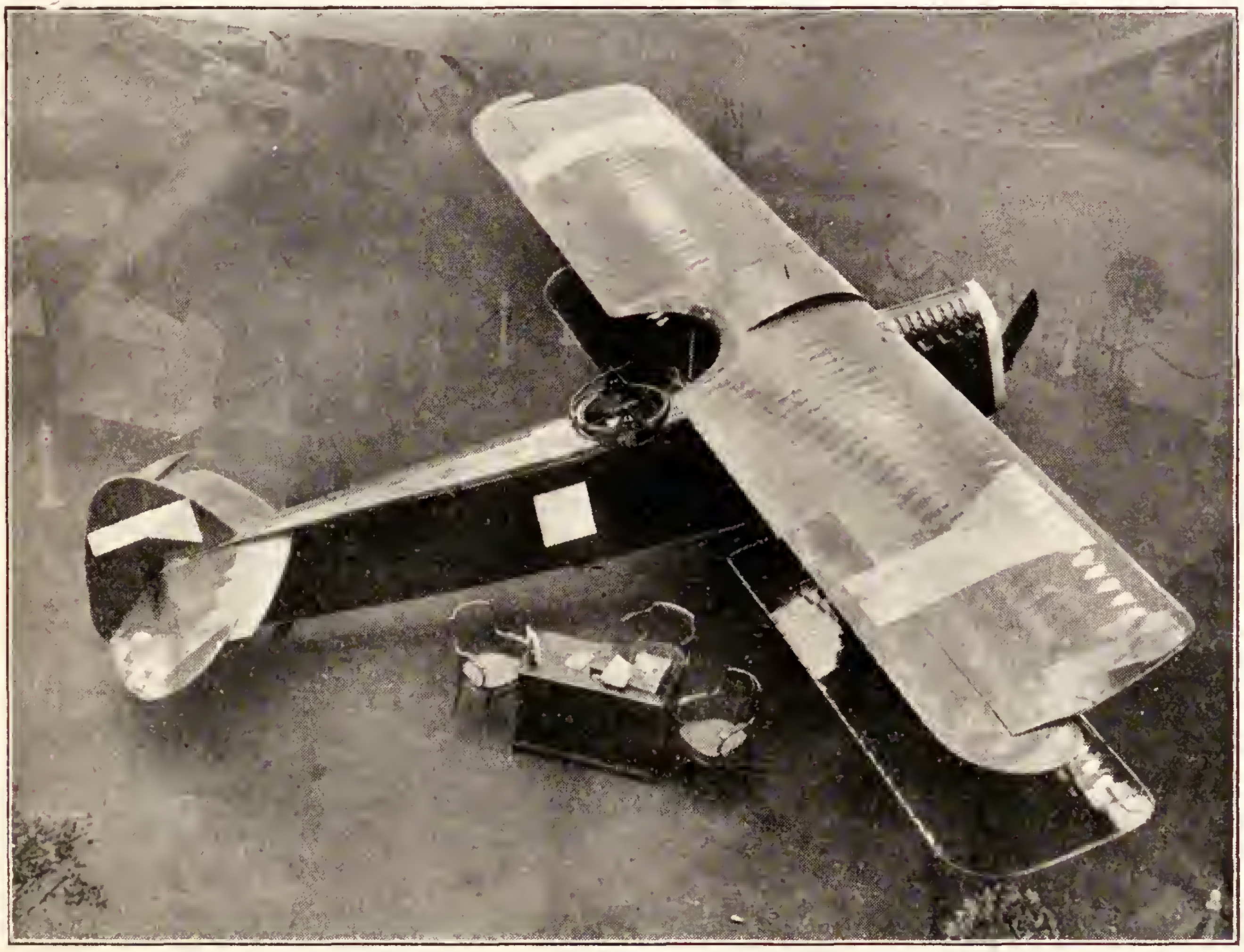
The Armstrong-Whitworth "Ajax" is very similar to the "Atlas" produced by Sir W. G. Armstrong-Whitworth Aircraft, Ltd., and which has recently been chosen as the British Army co-operation two-seater. The "Ajax" is, however, a general purpose machine, which may, if desired, be fitted with floats and used as a seaplane. As a matter of fact, on the Armstrong-Whitworth stand a pair of Short Duralumin floats for the machine were exhibited, and like the machine itself these attracted a good deal of attention, the more so as the French have not until comparatively recently had a great deal of experience in seaplane design. A drawing by Geoffrey Watson represented the "Ajax" as a twin-float seaplane.

One or two features of the "Ajax" are illustrated by sketches. The tail-trimming gear is very neat, its details being well shown in a sketch which is self-explanatory. Another interesting little "gadget" is the spring-loaded wire strainer in the anti-lft wires, the spring taking up any slack that may develop when the machine is flying, and thus preventing the vibration usually present in anti-lift wires. The sleeve covering the inter-plane strut attachments is another clever feature found on the "Ajax." When the split pin is withdrawn the sleeve can be slid along the strut, exposing the terminal fittings of the pinched tube attachment to the wing spar.

Compared with the undercarriages of some of the machines at the show, that of the "Ajax" is an extremely workmanlike affair, with its neat oleo shock-absorbing gear and sturdy common-sense fittings. It is noticeable that a much longer travel is provided than is found on the majority of foreign aeroplanes, and it may thus be assumed that the shock-absorbing qualities are correspondingly better.

AERO TOVARNA LETADEL

OUT of the two machines which the Aero Co. of Prague had intended to exhibit, only one actually was to be seen



The Aero Ab.11 is fitted with a 240 h.p. "Perun" engine. The machine is of straightforward orthodox design and construction.

["FLIGHT" *Photograph*

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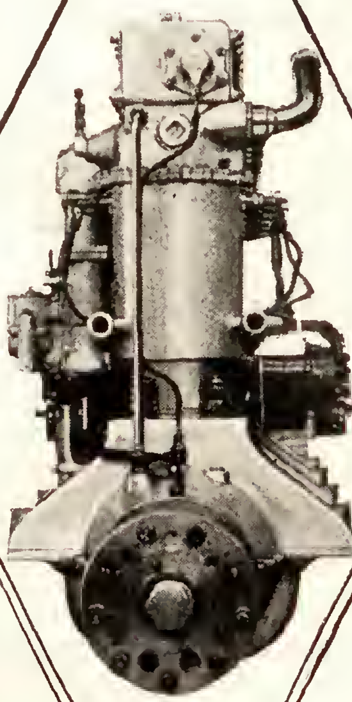

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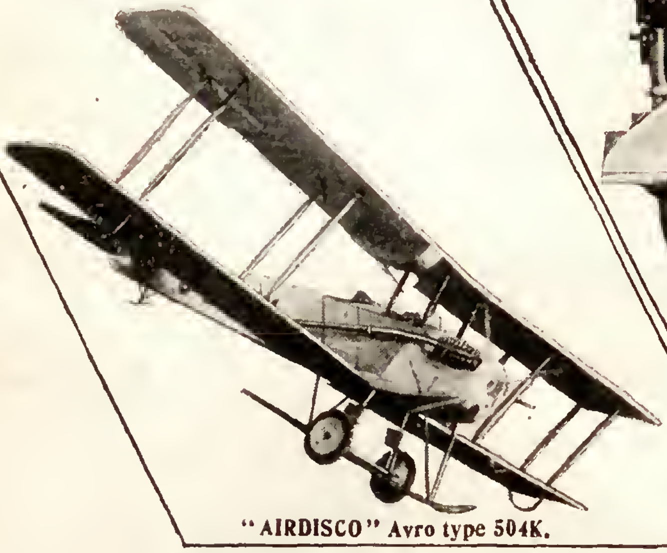

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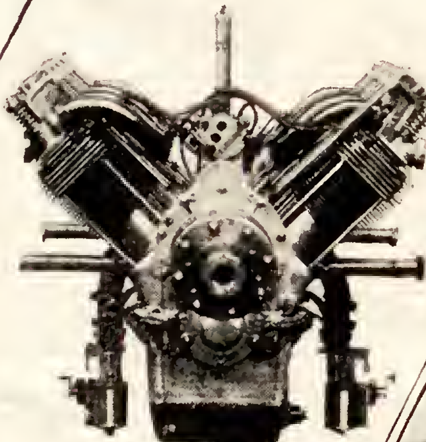
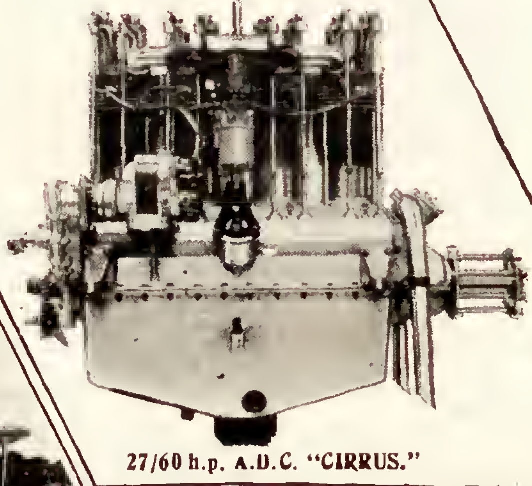


120/140 h.p. A.D.C. "AIRDISCO."



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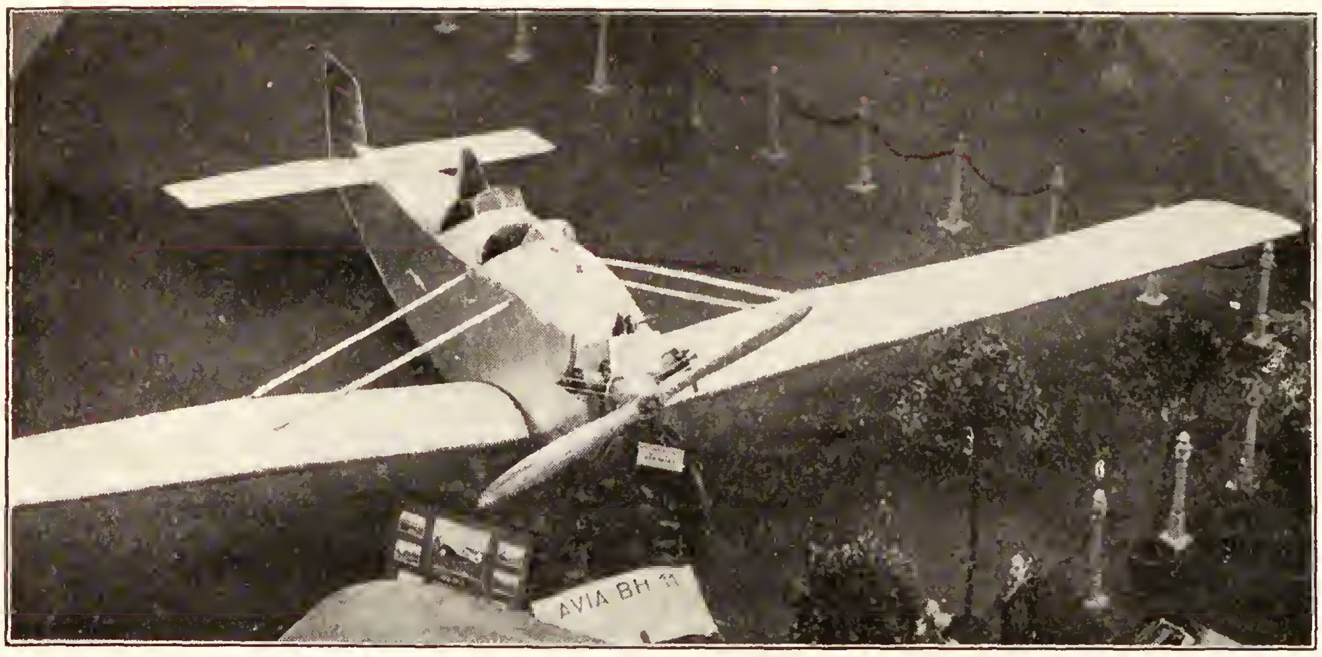
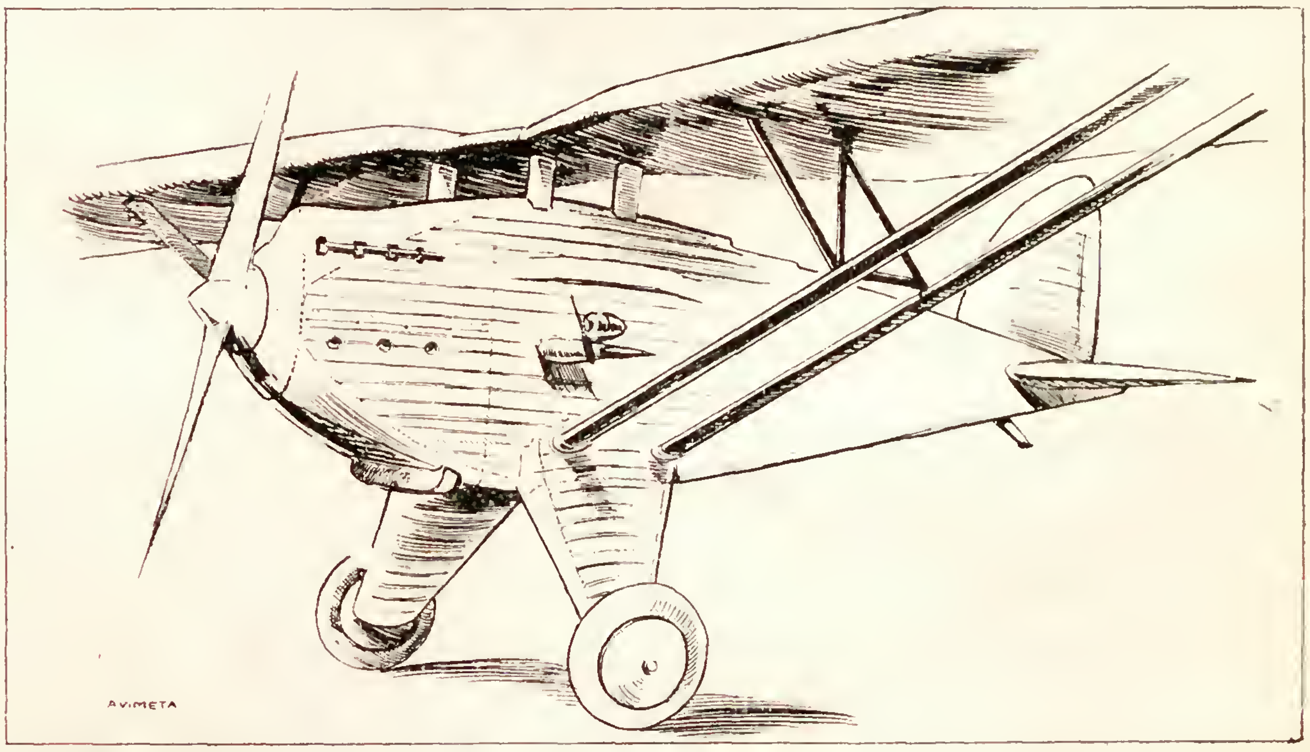


The "Avia B.H.11," with 60 h.p. Walter engine is a two-seater light 'plane with many victories to its credit, most recently that of the "Coppa d'Italia."

[" FLIGHT " *Photograph*

on the stand, and it was gathered that the other machine was expected to fly to Paris from Prague. Presumably bad weather had interfered with the flight, as the machine did not put in an appearance during our stay at the show.

Concerning the sole Aero machine exhibited on the Czechoslovak stand (which contained all the Czechoslovak machines exhibited), the Ab.11, with "Perun" engine, there is little to be said, as the design and construction of the machine are perfectly simple and straightforward. That the machine must be efficient aerodynamically seems evident from the performance figures, according to which the maximum speed at ground level is 215 km./h. (133·5 m.p.h.),



The Avimeta AVM88 is an all-metal parasol monoplane. Note the "Oxford bags"

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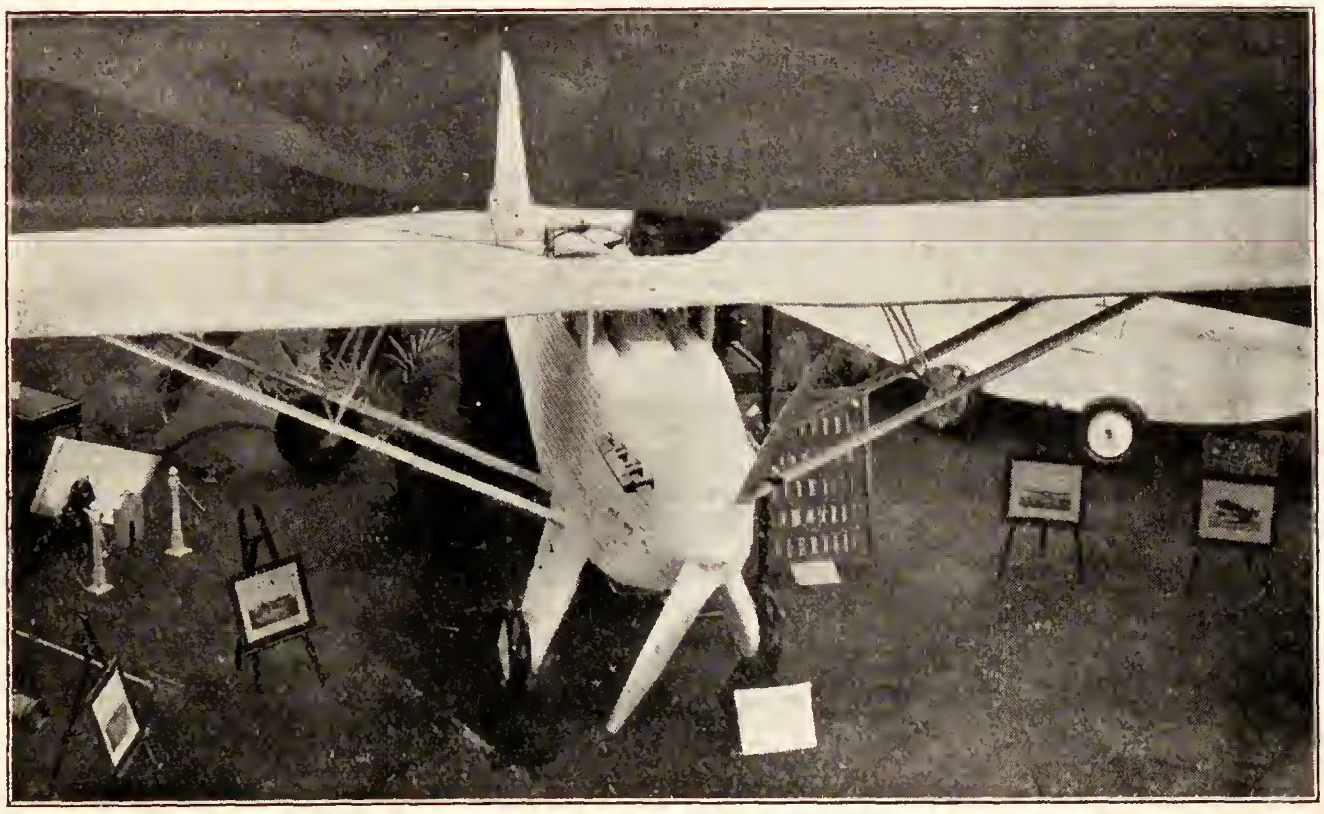
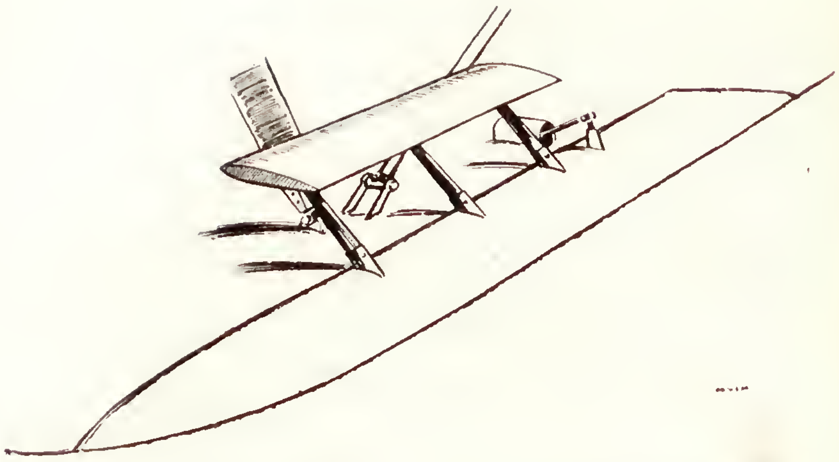


The Avimeta AVM 88 is built throughout of the light alloy Alferium, the product of the famous Creusot-Schneider firm.

[" FLIGHT " *Photograph*

while the climb to 2,000 m. (6,560 ft.) is given as occupying only 5 min. 10 secs. As the machine has a total loaded weight of 1,534 kgs. (3,380 lbs.), the power loading is 14 lb./h.p. The wing loading is approximately 8·6 lb./sq. ft.



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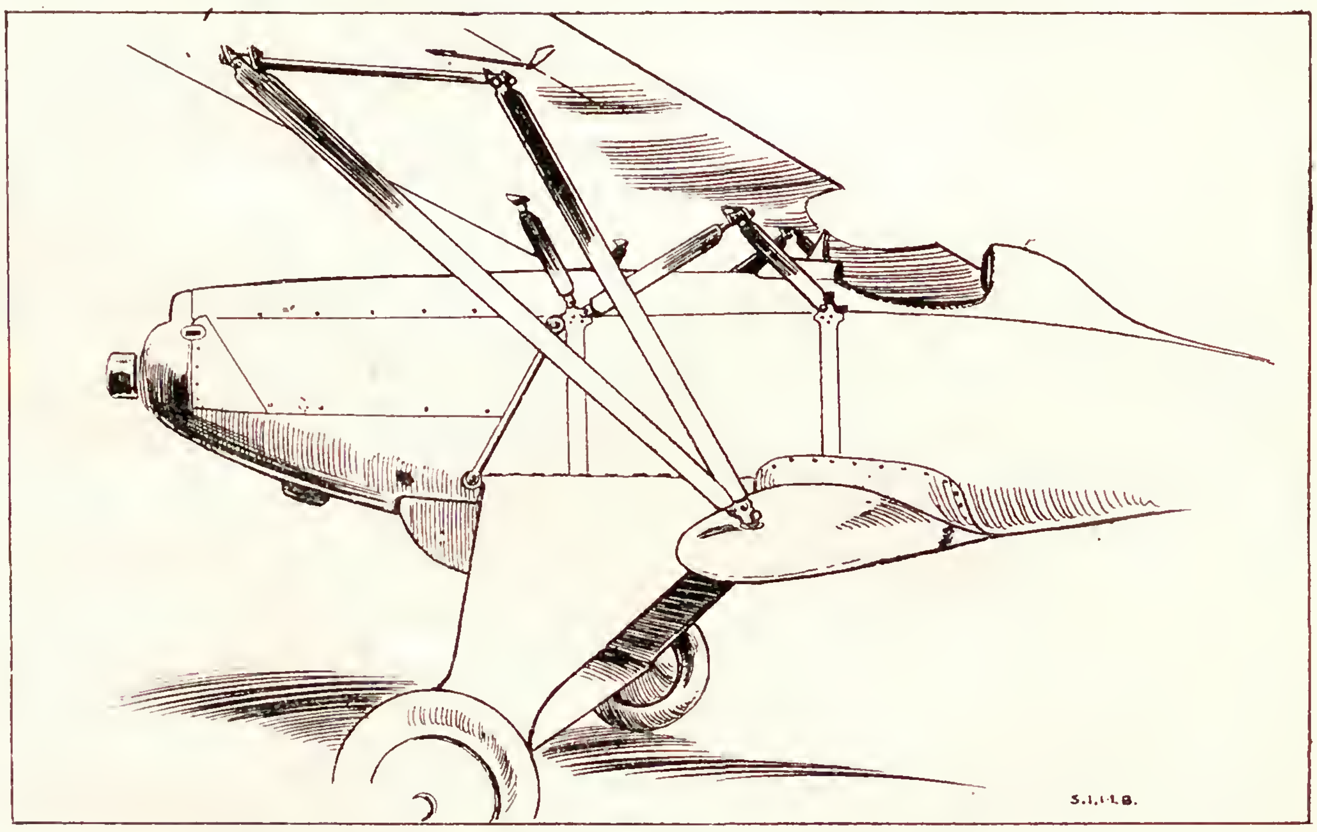
Small auxiliary surfaces mounted on cranks form the aileron balances on the Avia B.H. 26

AVIMETA

The parasol monoplane exhibited by the Avimeta Co., which is a subsidiary company of the famous Schneider-Creusot armament firm, is built throughout of the light alloy known as Alferium. It may be recollected that at the last Paris Aero Show two years ago, the Schneider firm exhibited a twin-engined twin fuselage machine of very unorthodox design, which was also built mainly of this material. In this year's machine, the A.V.M. 88, the metal has been employed in a slightly different manner, while the general design of the machine as an aeroplane follows that which seems to be becoming increasingly popular in France, *i.e.*, the parasol monoplane. That the machine is efficient aerodynamically appears probable, although it might be expected that the large cutout in the trailing edge above the fuselage may somewhat seriously affect the air flow and thus to some extent at any rate detract from what would doubtless be a very efficient monoplane wing. The wing bracing does not impress one as being any too good, and is of a type almost identical with that employed on the ill-fated Peyret monoplane on which Maneyrol was killed at Itford, with long lift struts sloping out at a fairly flat angle and steadied in their middle by shorter struts to the wing spars. On the other hand the main lift struts are certainly of ample cross section, so that possibly the wing structure is stronger in down loads than might at first be supposed.

The undercarriage is of the divided type in which each wheel



The Bernard 15 C.1 has semi-cantilever wing bracing and *sesquiplan* wing formation. Except for struts, &c., this machine is of all-wood construction

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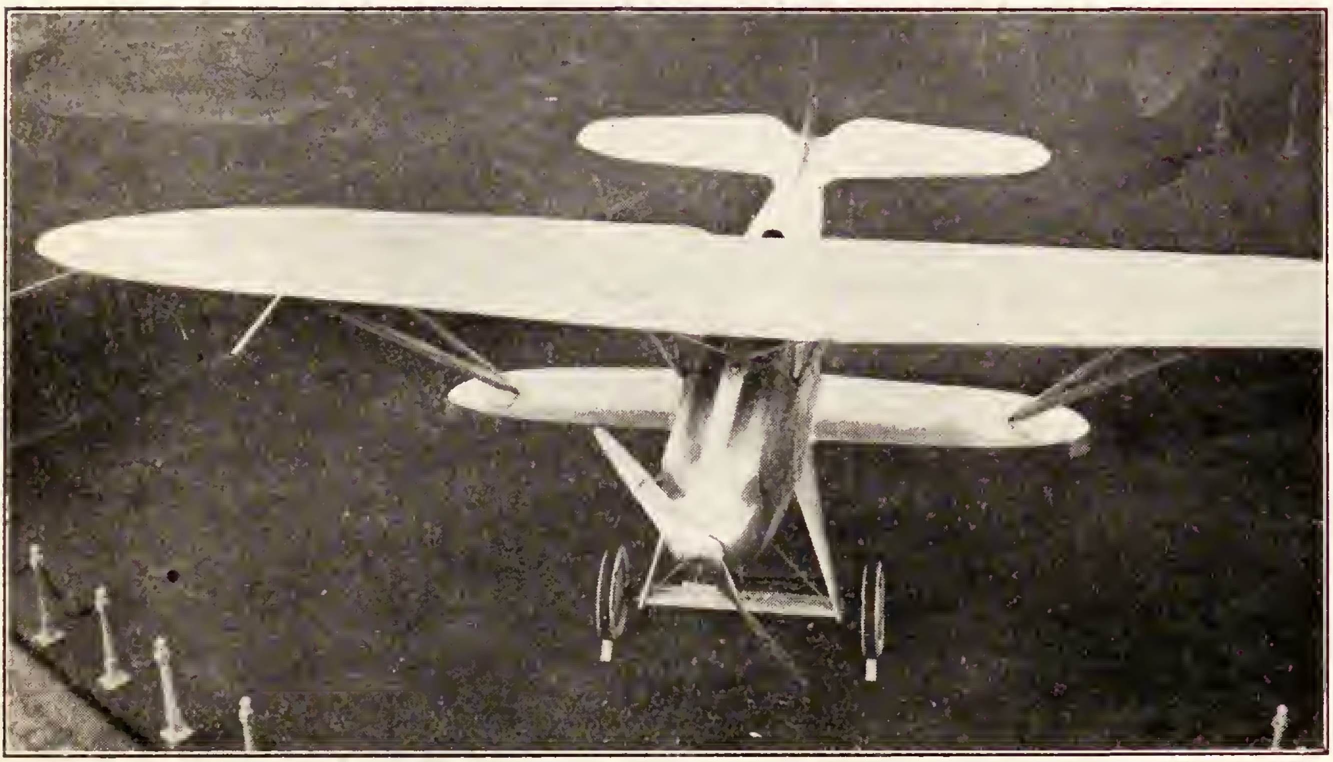

The Bernard (Ferbois) 15 C.1 somewhat resembles the Fokker machines in its lay-out. It is, however, of all-wood construction.

[Flight *Photograph*

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THE Avro "Avian" is essentially a private owner's machine, but it must be remembered that above all, it is an efficient aeroplane. A feature which aroused the greatest interest at the Light Aeroplane Competitions at Lympne, was the extraordinarily large useful load which it carried and the high speed it attained while carrying this load.

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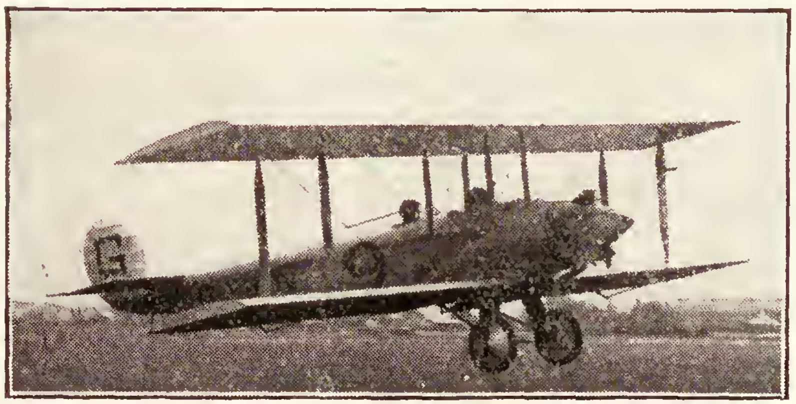

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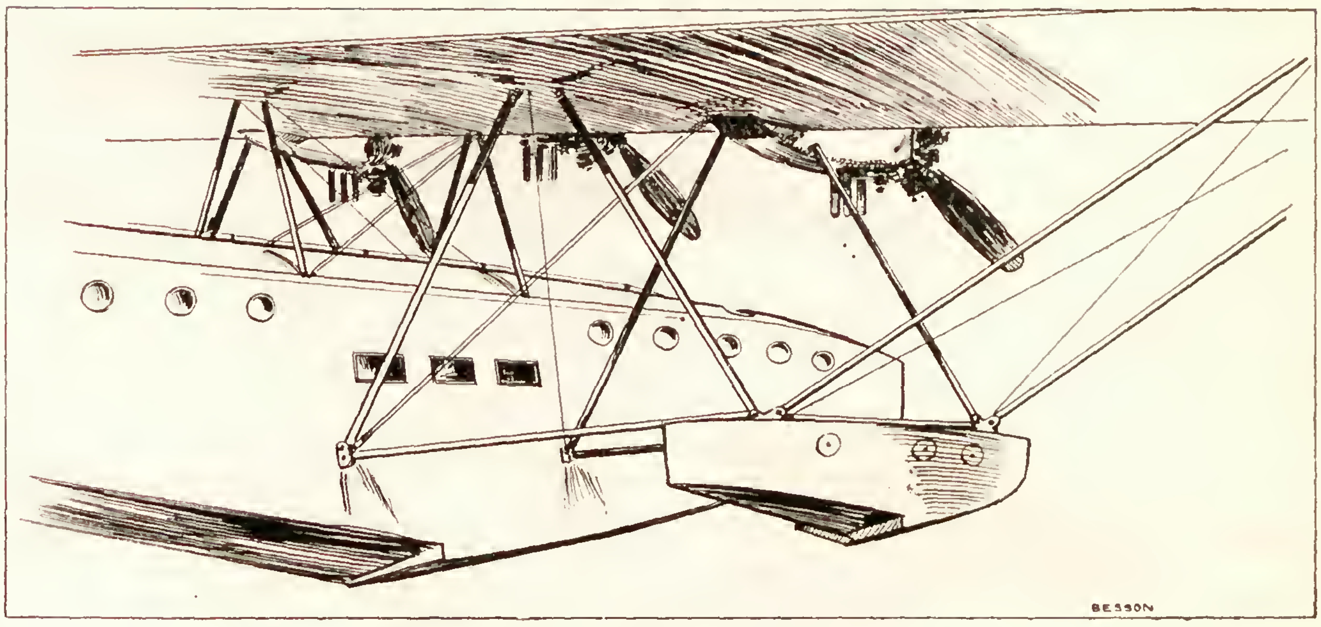

Three-quarter rear view of the Marcel Besson M.B.36. The machine is fitted with three "Jupiter" engines

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is carried independently of the other on a species of trouser leg. The metal covering of this machine is lightly corrugated at intervals of 4 in. or so, the radius of the corrugations being approximately a quarter of an inch, and the corrugations running in a fore and aft direction. According to British ideas the rudder appears distinctly small for a comparatively large machine, but should it be found to be inadequate it is of course a comparatively easy matter to remedy this defect, and the machine otherwise seems to have distinct possibilities as a high performance two-seater fighter.

BERNARD (FERBOIS)

THIS firm, one of whose machines holds the world's speed record, exhibits a very neat little single-seater fighter in which the designer has obviously been influenced by the Fokker biplanes, in that he has employed a large top plane and a very diminutive bottom plane, the two braced together by a pair of Vee struts on each side, but without any external wire bracing. The top plane is roughly of elliptical plan form, and the ailerons extend over the entire span with the exception of a very small cut-out in the centre immediately above the cockpit. The whole machine is very carefully streamlined and looks as if it should be very efficient aerodynamically. Constructionally the Bernard 15.C.1 differs from the Fokkers in that it is an all-wood structure both as regards wings and fuselage. The speed of this machine is given as 260 km./h. (161 m.p.h.) and in view of the careful streamlining and with a Hispano engine of 500 h.p. it seems likely that this performance is actually attained.

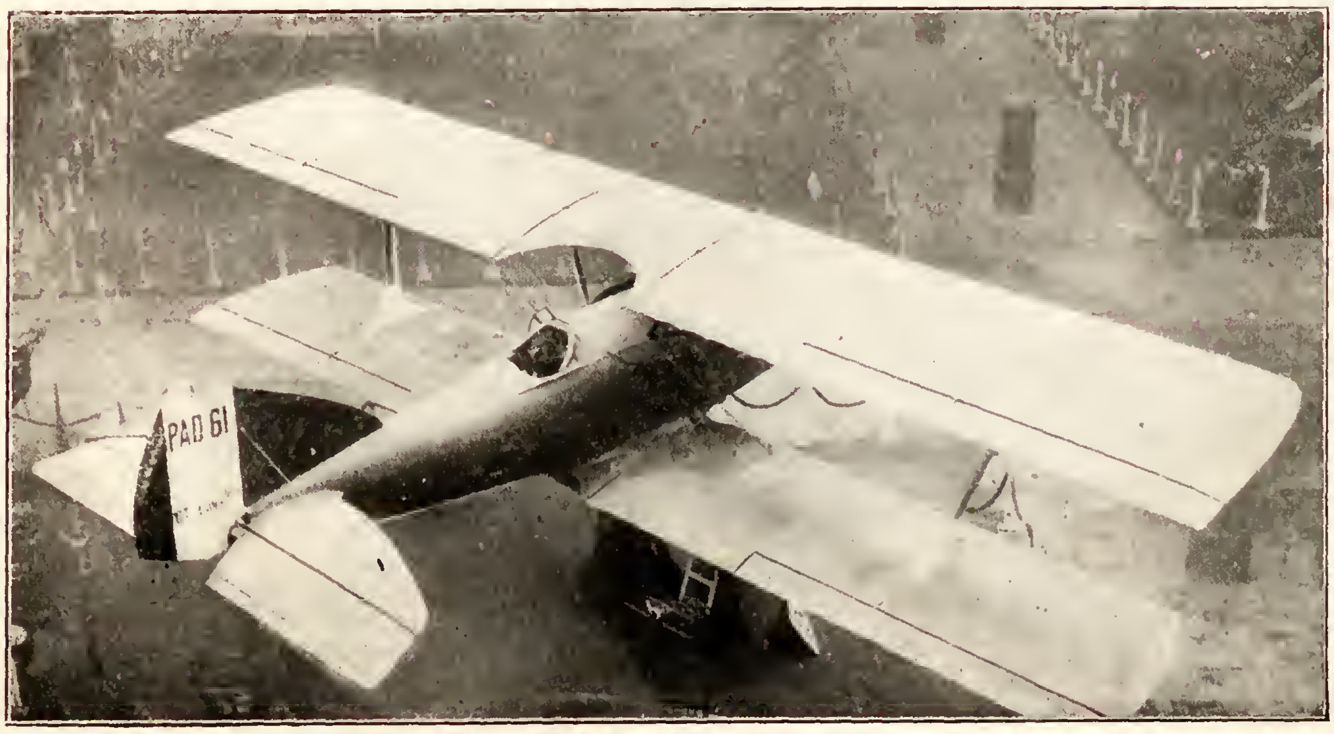
Whether inspired by the late arrival of the Armstrong Whitworth "Ajax" or through mere coincidence, one cannot say, but one morning several days after the opening of the Show, a new type of Bernard machine was suddenly discovered on this stand. This was a type 12.C.1 with Jupiter engine, and was of all-metal construction even to the covering, which was in general principle similar to the covering of an earlier single-seater shown by this firm at the 1924 Paris Show. This covering consists of sheet bent to channel sections, the flanges riveted internally to multiple spars. Certain changes were, however, to be noted in the way in which the width of these channels varied according to local requirements, doubtless with a view to facilitating construction. No particulars of this machine were available up to the time of our representatives' leaving the exhibition, but doubtless more will be heard of it in the future. Personally we prefer both the lines and the construction of the type 15.C.1.

MARCEL BESSON

ALMOST the only machine in the exhibition concerning which it was found difficult to obtain any detailed information was the large three-engined monoplane flying-boat exhibited by Marcel Besson. The machine has a very large flying-boat hull of rather pleasing lines, but the single step and straight Vee bottom is scarcely in keeping with the most modern British ideas on the subject of flying-boat design.

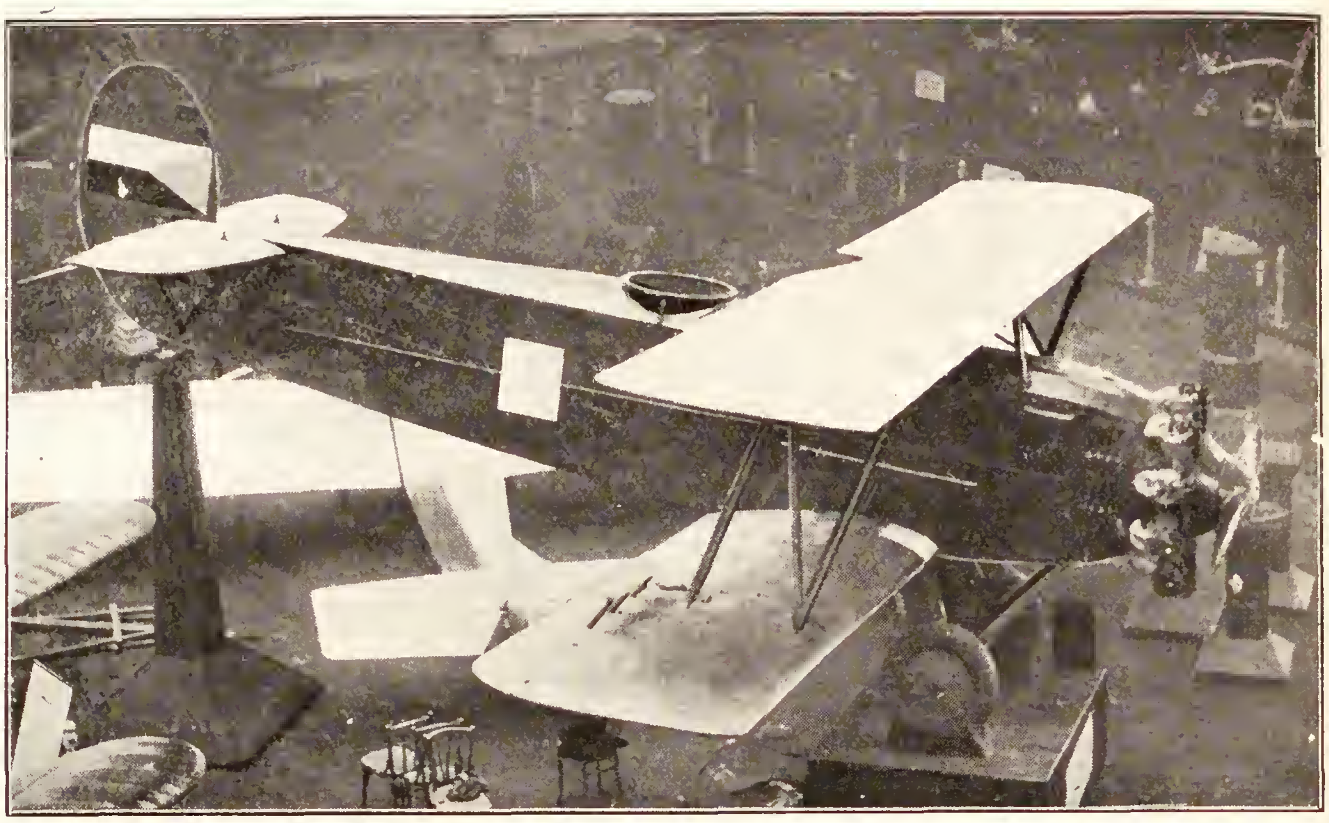
A placard on the stand announced that this machine, the type M.B.36, with three Gnôme-Rhône-Jupiter engines, has an area of 130 sq. m. (1,400 sq. ft.). The weight empty, but equipped, is given as 5,150 kg. (11,330 lbs.). The load carried is 2,850 kg. (6,275 lbs.), giving a total loaded weight of 8,000 kg. (17,600 lbs.). The commercial load is given as 1,350 kg. (3,000 lbs.) and the machine is said to have a range of 900 km. (560 miles). A top speed of 180 km./h. (112 m.p.h.) is claimed. The machine has accommodation for 14 passengers and there are two large luggage compartments.

The M.B.36 was exhibited with its wing uncovered, so that a certain amount of detail could be seen, although for some reason or other those in charge of the stand refused to have anything on the machine sketched in detail. The wing structure did not impress one as being any too strong. Altogether the wing structure gave one the impression that



The Bleriot-Spad 61 holds the world's altitude record with a height of 12,442m. (40,800 ft.).

["FLIGHT" *Photograph*



The Milos Bondy "Avia B.H. 26" is the first Czechoslovak two-seater fighter to be fitted with a "Jupiter" engine.

["FLIGHT" *Photograph*

it had originally been intended to build it in metal, but that at the last moment it became necessary to rush through a wooden wing. The mountings of the three Jupiter engines were in the form of very small girders of small diameter steel tubing, cross braced with piano wire and placed inside the wings. These mountings looked far from substantial, and it seems fairly certain that they will have to be re-designed before the machine becomes a practical proposition. With a slightly improved wing structure there does not, however, appear to be any reason why the M.B.36 should not be turned into quite a useful commercial seaplane.

Another Besson machine exhibited was a little low wing mono-seaplane designed to operate from a submarine. This machine, which was of quite normal design and construction, was shown on the French Navy stand adjoining the Besson stand.

BLERIOT AERONAUTIQUE

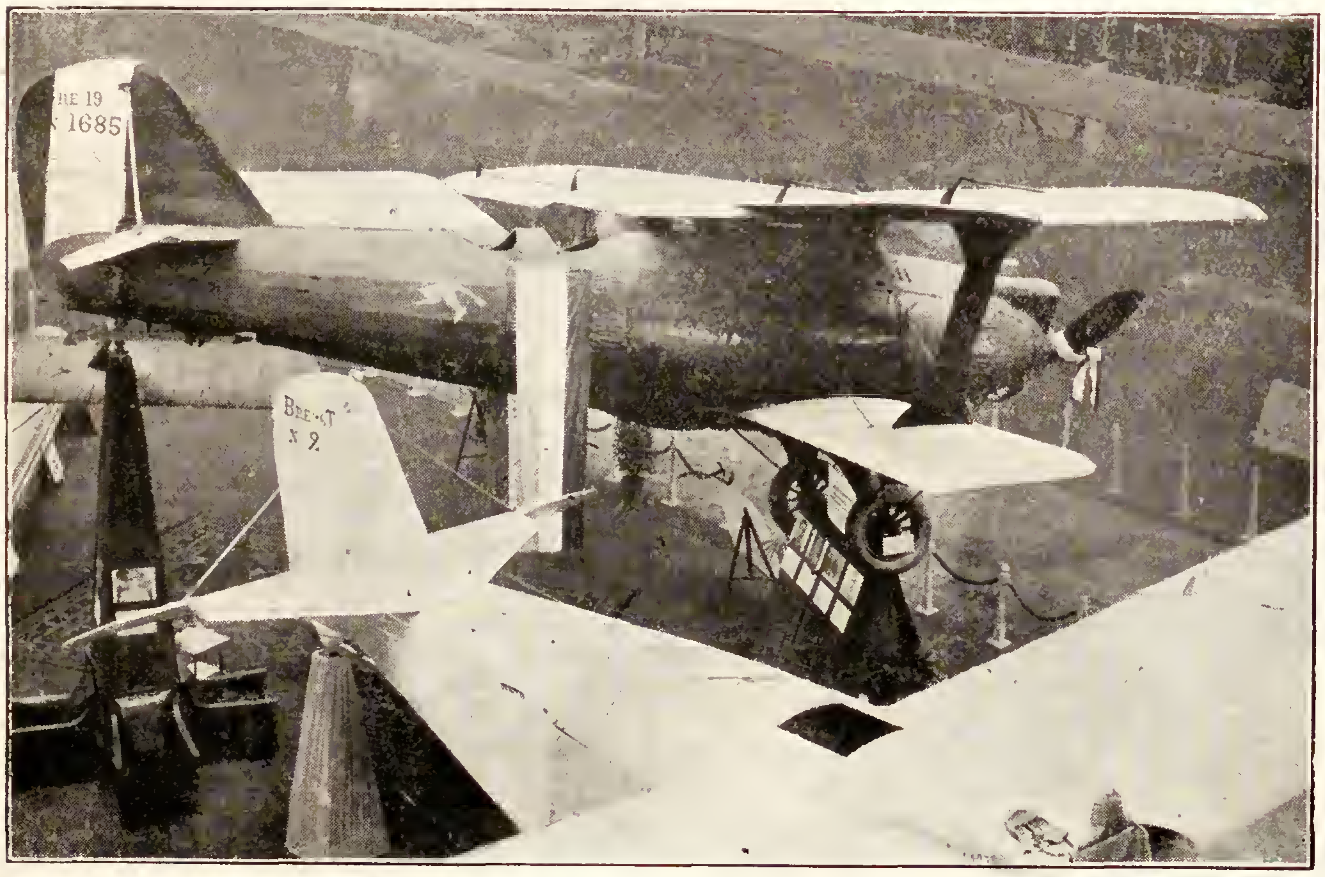
THE only complete machine exhibited by this famous French pioneer constructor was the Spad 61, which holds the world's altitude record. This machine is of orthodox Spad design and construction, and therefore calls for little comment. The speed claimed for it of 283 km./h. (176 m.p.h.) at 5,000 metres, seems somewhat optimistic, even allowing for the supercharged 450 h.p. Lorraine-Dietrich engine.

Of the new Bleriot 165 commercial aeroplane with two Jupiter engines, only the fuselage was exhibited. The cabin is planned on normal lines, and the most impressive feature of the machine is perhaps the very elaborate ventilating and heating arrangement, the mechanism of which was exposed under the floor of the fuselage, and to which special attention was called by placards on the stand.

The Bleriot form also exhibited several "noses" with Hispano and Jupiter engines, showing variable pitch airscrews of wood and metal.

MILOS BONDY A SPOL

OF the two machines exhibited by this Czechoslovak firm the Avia B.H.11 light 'plane two-seater is already well known, having been in existence for several years, and having a long list of victories in various competitions to its credit. Recently this type won the "Coppa d'Italia." The other Avia machine, the type B.H.26, is a two-seater fighter fitted with "Jupiter" engine. As far as we are aware, this is the first two-seater fighter of Czechoslovak design and construction to be fitted



The world's distance record holder: The Breguet 19, which flew from Paris to Djask, a distance of 5,400 km. (3,350 miles), in 32 hours, non-stop. In the foreground may be seen the rear portion of the Breguet 26T commercial aeroplane.

["FLIGHT" *Photograph*

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"Had there been any mishaps there might have been something to write about, but as it happened, from start to finish, everything ran perfectly."

"The reliability of the engines and aeroplanes was no doubt a great factor in determining whether the Flight kept to time-table or not."

"Although most of the country flown over between KOSTI and PRETORIA was bad for a forced landing, the pilots had such faith in their engines and aeroplanes that the idea of a forced landing seldom, if ever, crossed their minds."

"It should clearly prove to the world in general the reliability and efficiency of British Aircraft . . ."

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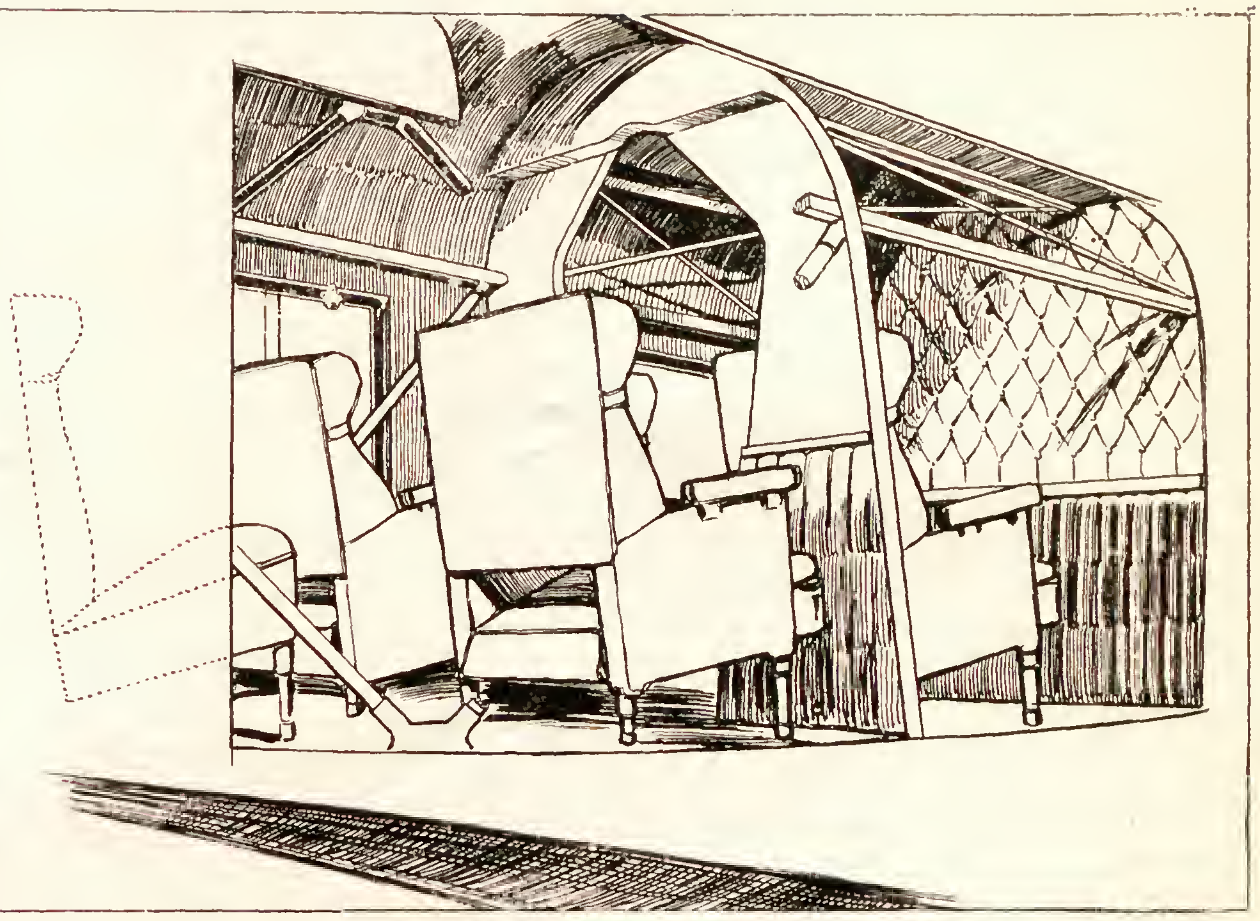

Sectioned view of the cabin of the Breguet commercial aeroplane

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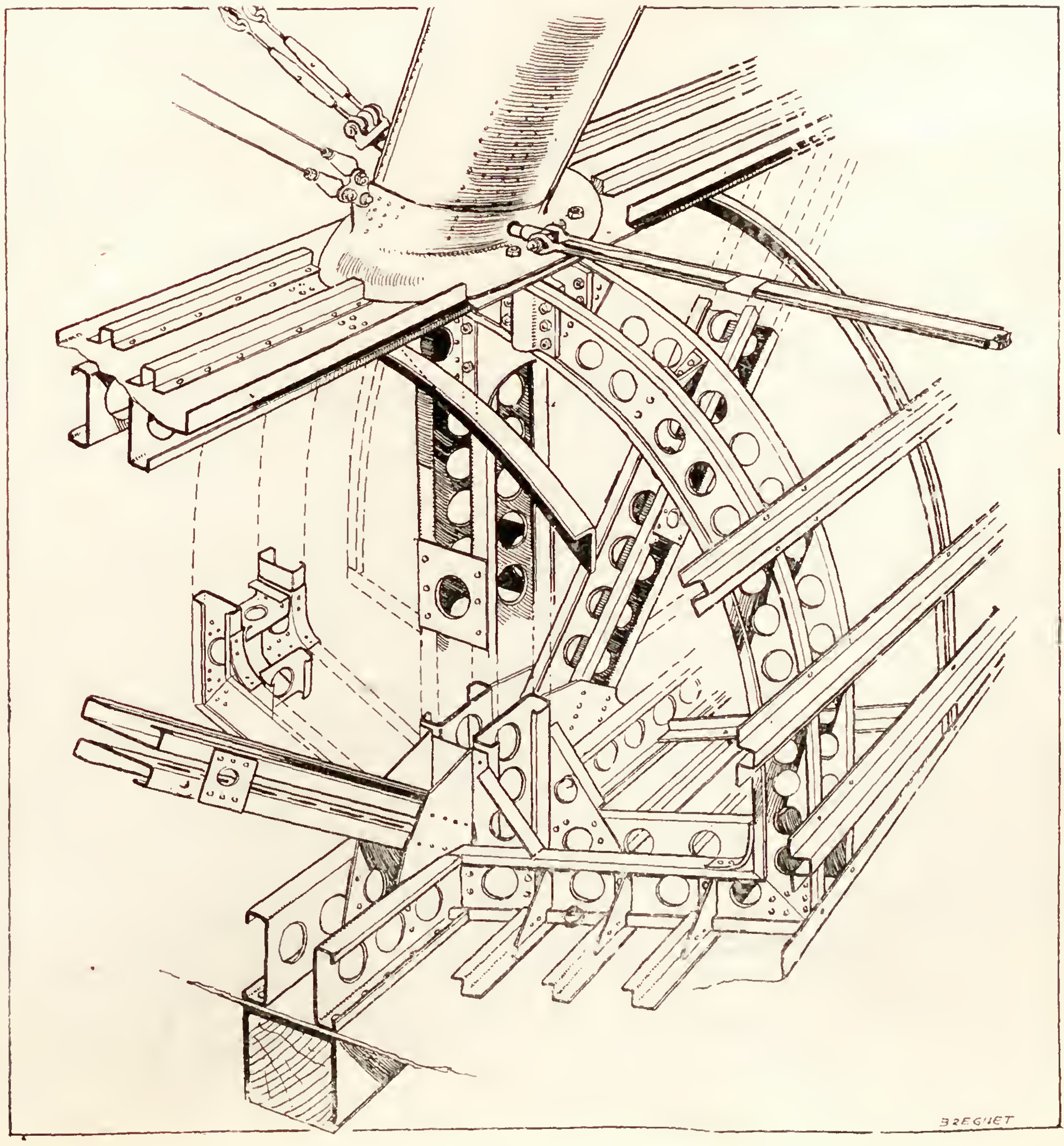


Breguet Float Construction: The Breguet 19 seaplane exhibited at Paris was fitted with all-metal single-step floats, similar as regards general lines to modern British seaplane floats. This sketch shows most of the constructional details, such as the type of keel used, the double formers, the fore and aft stringers, the diagonal bracing members, and the trough-section external stiffeners, which are placed outside the skin and riveted through. A feature of the floats is the wooden rubbing strake under the keel, evidently intended to protect the metal bottom against damage during beaching operations.

[" Flight " Copyright

with this engine, and certainly Messrs. Benes and Hajns have produced a very business-like aeroplane. The B.H.26 is of perfectly standard Avia design, and there is little in the details of the construction which calls for comment. Now that the firm of Milos Bondy A Spol has been taken over by the famous Skoda works, presumably more capital will be available for development work, and the two clever and energetic designers of the firm may be relied upon to rise to the occasion and to produce machines which shall worthily uphold the excellent reputation which the firm in its smaller form has already established.

BREGUET

There can be no doubt that at the moment the Breguet firm dominates French aviation, and the famous long-distance flights carried out during the past year on Breguet machines give the firm some claim on a leading position within the French aircraft industry. One of the exhibits consisted of a Breguet XIX with 500 h.p. Hispano engine, which has been used in several of the long-distance non-stop flights of the year, and is claimed to have covered no less than 40,000 km.

The Breguet XIX can also be supplied as a seaplane, and one such machine was exhibited fitted with Duralumin floats, one of which was shown in section so as to make an inspection of the construction possible. A fairly elaborate sketch of this float construction is given on p. 829, from which the main details will be clear. In the main this construction follows British practice, with the exception of the wooden keel, which is no doubt intended to protect the metal against scratches when the machine is being beached, and the external channel section stiffeners on the domed deck of the floats.

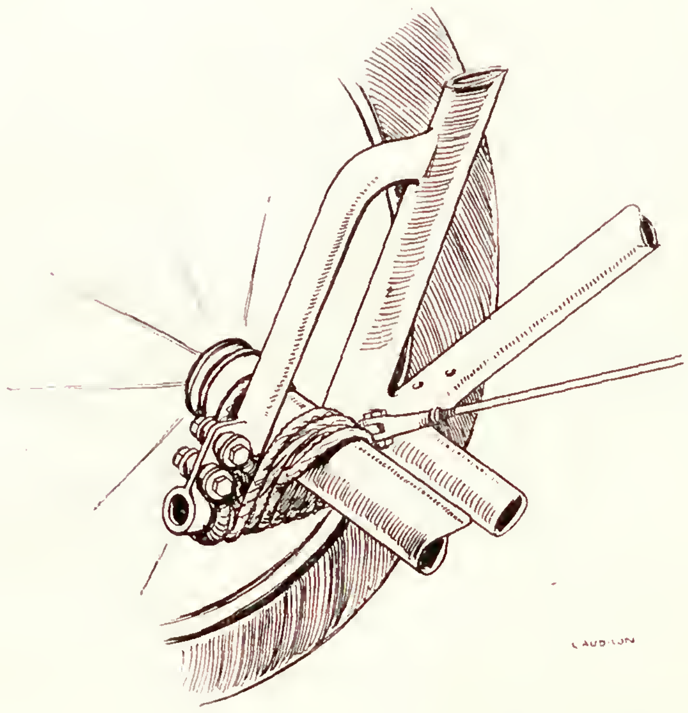
Most interesting of the Breguet exhibits was perhaps the new Breguet commercial aeroplane, the type XXVI T. This machine is of typical Breguet lines and the form of construction is similar to that made famous by the Type XIX. It is understood that the XXVI T. is only regarded as an experimental type, and that it will be replaced by a later model, the XXVIII T., which will have a slightly larger wing area and will carry eight passengers instead of the six for which accommodation is provided in the XXVI T. The tail plane of the XXVI T. looks somewhat inadequate in size, and it would seem likely that in the XXVIII T. a tail of considerably greater area will have to be fitted. The machine is so typically Breguet in its details that no further reference is required. A sketch, with the cabin wall removed, shows the arrangement of the passenger accommodation.

CAUDRON

In our preliminary show report of December 2 it was stated that the famous French pioneer aircraft firm of Caudron would exhibit but one machine, the C.104. This machine is actually shown, and is a two-seater long-distance, reconnaissance machine of typical Caudron lines and simple mixed wood and metal construction of the type which Caudron has produced since the comparatively early days of flying. The machine, data relating to which have already been published, does not call for any comment. In addition to the more powerful machine, Caudron exhibited two school machines and the little parasol monoplane, type C.109, which did so well at Vauville last year, piloted by Van Laere, and also at Brussels. All these machines, however, are already well known to our readers, and it will suffice if we record here their presence at the show.

DESCAMPS

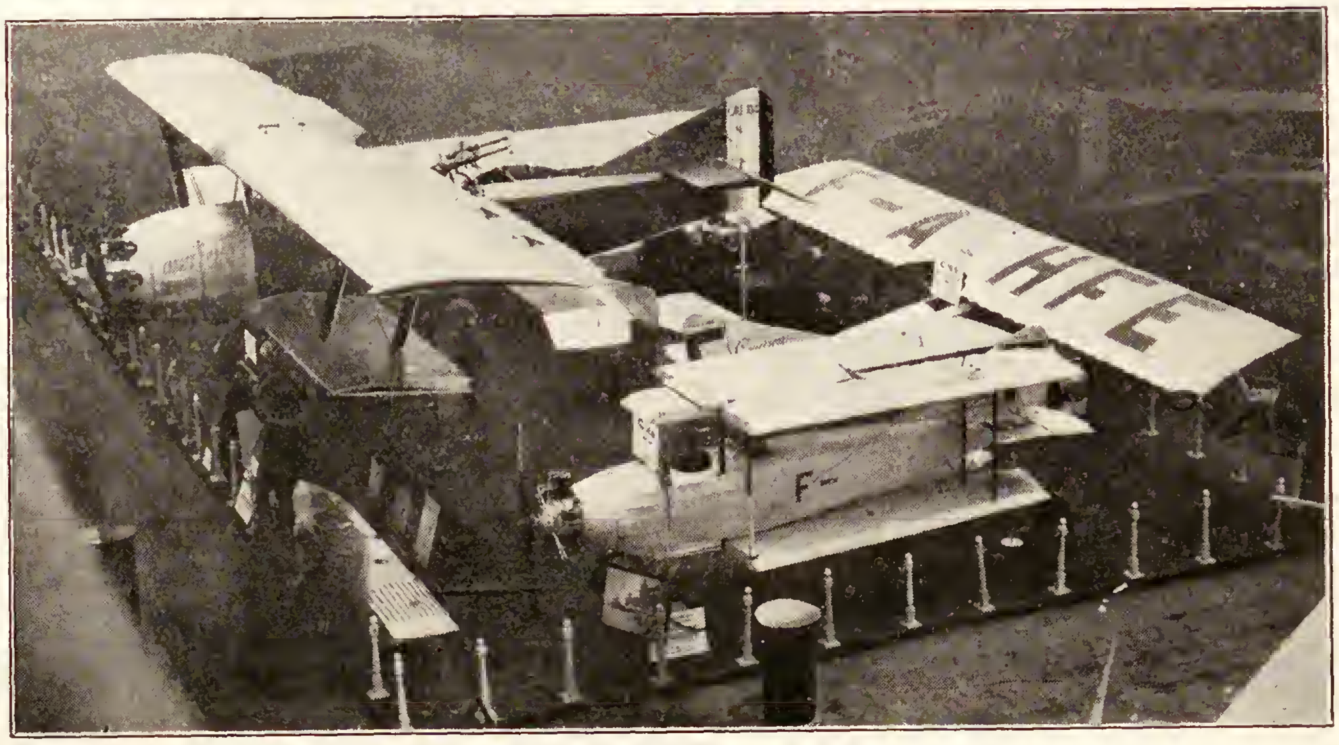
We have been asked to correct certain statements made in our preliminary show report concerning the little two-seater fighter exhibited by the *Société des Avions Descamps*. Thus, it was stated that the machine is of all-metal construction, whereas in point of fact the wing and fuselage covering are of fabric. The performance figures given by our correspondent are also claimed to be incorrect in that they under-estimate the actual figures. Thus the top speed near the ground is claimed to be 230 km./hr. (142·5 m.p.h.), while the climb to 5,000 m. occupied 24 mins. 53 secs., the speed at 5,000 m. being 196·5 km./hr. (122 m.p.h.).



["Flight" *Copyright*

The slot for the undercarriage axle is formed by a short welded-on tube on the Caudron C. 109 parasol monoplane two-seater light 'plane.

The Descamps type 17 A.2 is in the same class as the Breguet 19 and Potez 25, and it is claimed that it has a better performance. In its design simplicity of construction has been the feature aimed at, and certainly the Duralumin tube fuselage is about as simple as anything we have seen. The claim that it is not only quick and cheap to build, but also



The Caudron Stand: The large machine is the C.104, two-seater fighter, while the smaller types include training machines and a light monoplane two-seater, the C.109.

["Flight" *Photograph*

The Descamps 17 A 2 is a two-seater fighter of very simple construction. The wheels are attached in their fairings somewhat after the style of a bicycle wheel. Rigid bracing is a feature of this machine.

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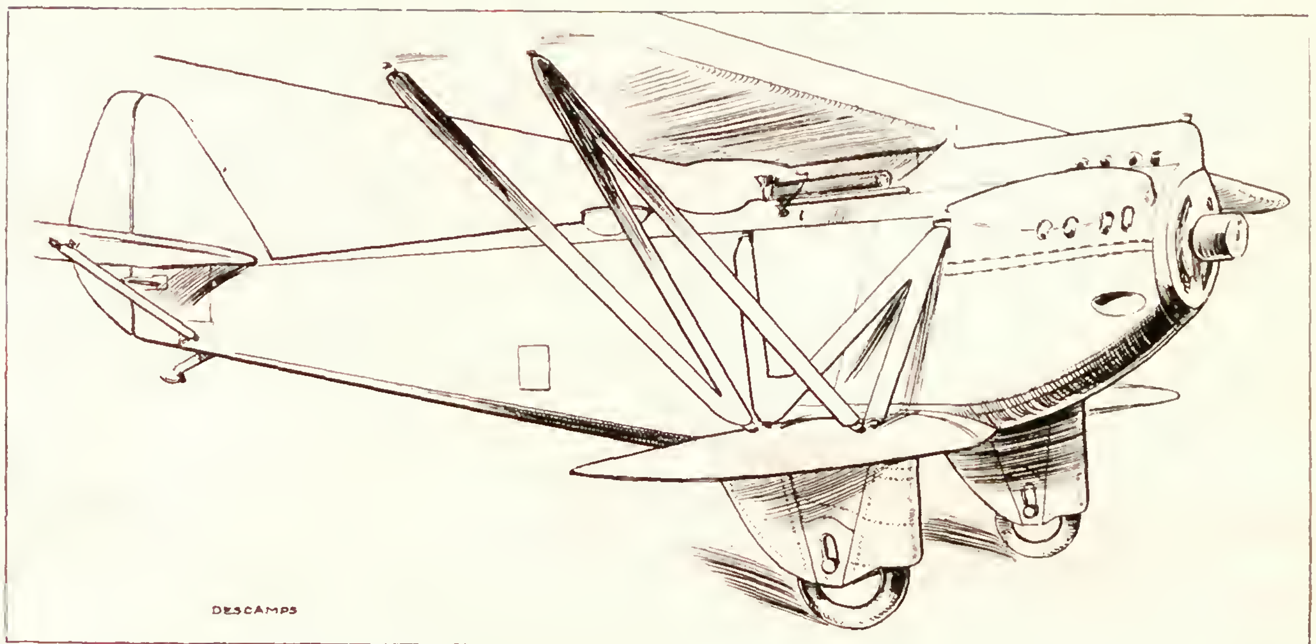


easy to repair in the field, appears well founded. Concerning the wing construction nothing could be gathered, although we have been promised some illustrations showing details. These we hope to publish at a later date. A feature of the machine is that no wire bracing is employed anywhere, so that the machine is regarded as being indeformable, and thus to require a minimum of keeping in flying trim in actual service.

DYLE ET BACALAN

Of the D.B.10 only the nose and centre portion was exhibited. The machine is of all-metal construction, of a type which looks somewhat heavy In order to illustrate the fitting of different engines, the portion of a machine exhibited had a water-cooled engine on one side and a radial "Jupiter" on the other, an arrangement that may possibly have puzzled the less sophisticated visitors to the show.

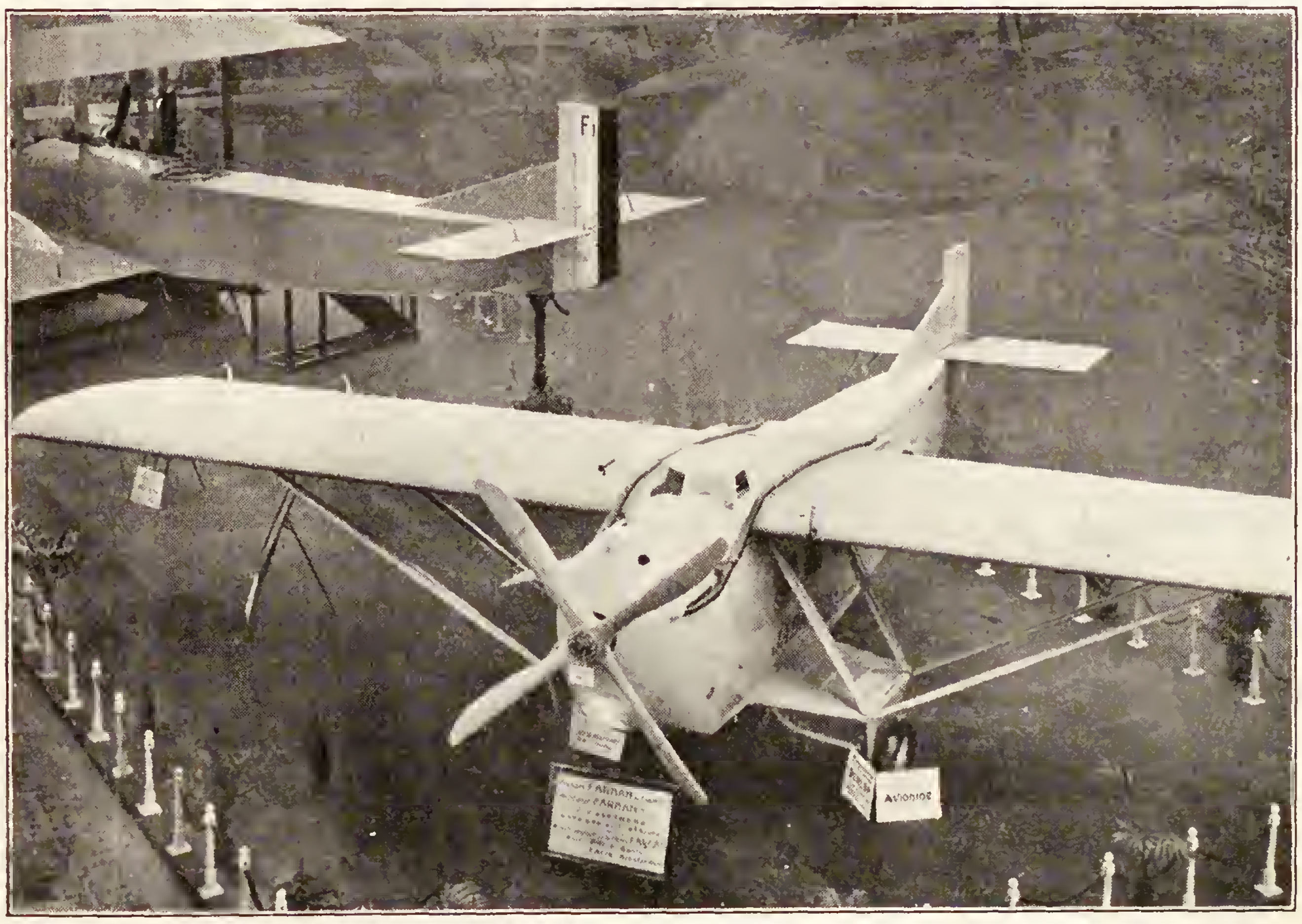
H. & M. FARMAN

Two large machines formed the exhibits on the Farman stand this year, one of which was the new Farman commercial monoplane, type 170T, and the other a large night bomber, type 160 B.N., of which only the fuselage and centre portion were shown. This latter machine impressed one mainly on account of the very excellent lay-out of its crew accommodation, which had obviously been very carefully studied and was a pattern of what a machine of this class should be from the point of view of those who have to serve in it. The bombs, armament, instruments, etc., were admirably placed, and in spite of a very extensive equipment of every sort, there was everywhere ample room to move about. An unusual feature of the bomber is the small tail trimming plane, which enables a fixed main tail plane to be used.

The commercial monoplane, which, owing to its low position over the ground, has been nicknamed "Ventre-a-Terre," is a development of the "Jabiru," and is a much more likeable machine altogether, although the rectangular wing with square tips is not exactly calculated to enhance the appearance. The pilot is, as the accompanying photograph will show, situated right above and ahead of the wing, and has a sort of miniature conning tower protecting him against the wind. In fact, the machine might almost be described as being of the *conduite intérieure* type.

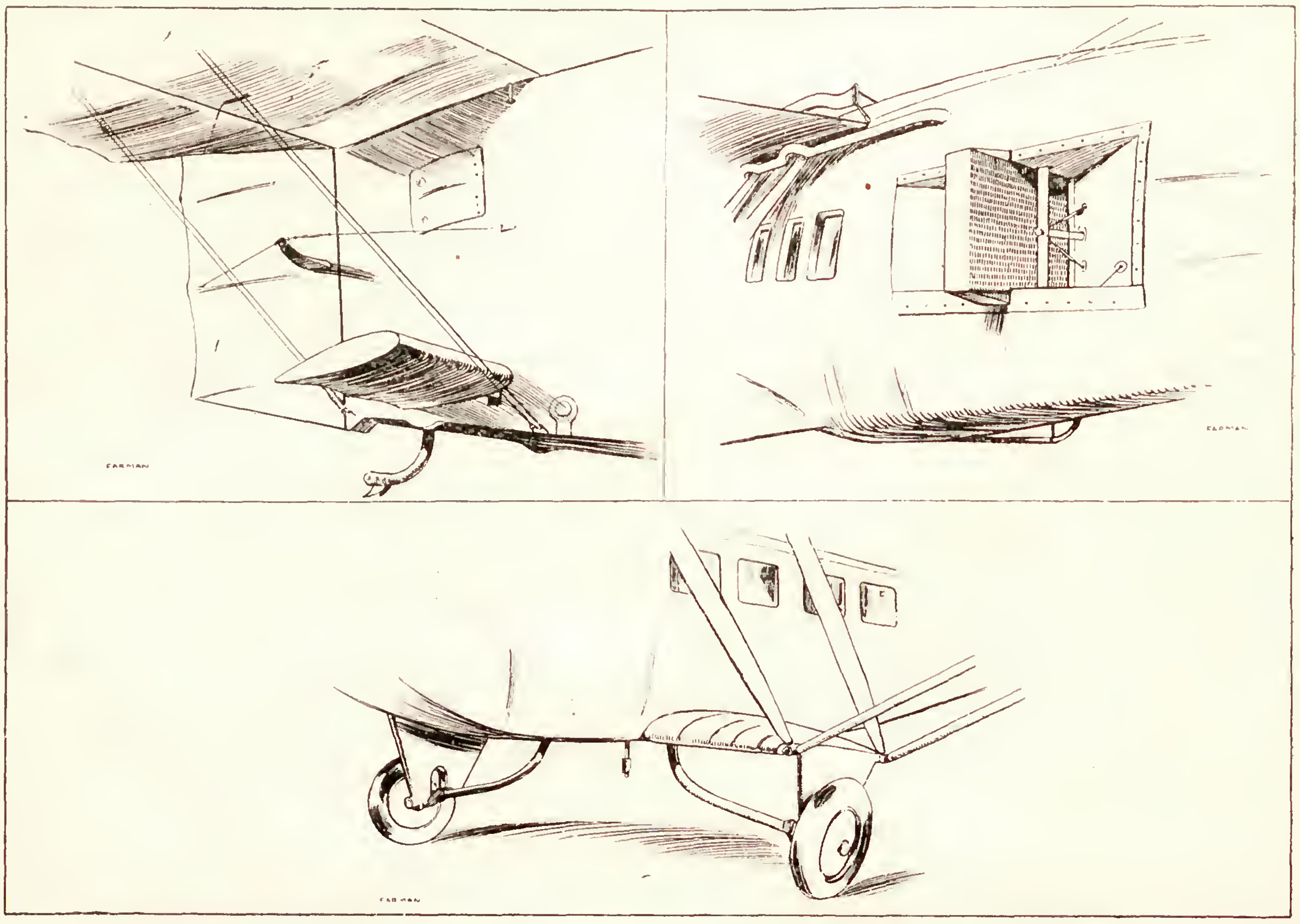
The passenger accommodation (for eight passengers) is comfortable, and the heating of the cabin is by hot water from the radiators, which are very unusually placed projecing through the sides of the fuselage halfway back to the tail. This feature is illustrated by a sketch. Two long exhaust pipes running over the top of the wing carry the gases well away, and probably the cabin is almost free from noise.

The engine fitted in the Farman 170T is a 500 h.p. Farman and drives a four-bladed propeller. Owing to the removal of the radiators aft, a very "clean" nose has been made possible.



The "Ventre-a-Terre": An unconventional view of the Farman commercial monoplane with 500 h.p. Farman engine.

["Flight" *Photograph*



[" FLIGHT " *Copyright*

Some Farman details : The upper left-hand sketch shows the separate tail trimming plane. The use of this enables the main tail plane to be rigidly attached. On the right the unusual placing and mounting of one of the radiators on the Farman commercial monoplane. The cabin is heated by hot water from the radiator. Below, the undercarriage of the " Ventre-a-Terre "

FIAT

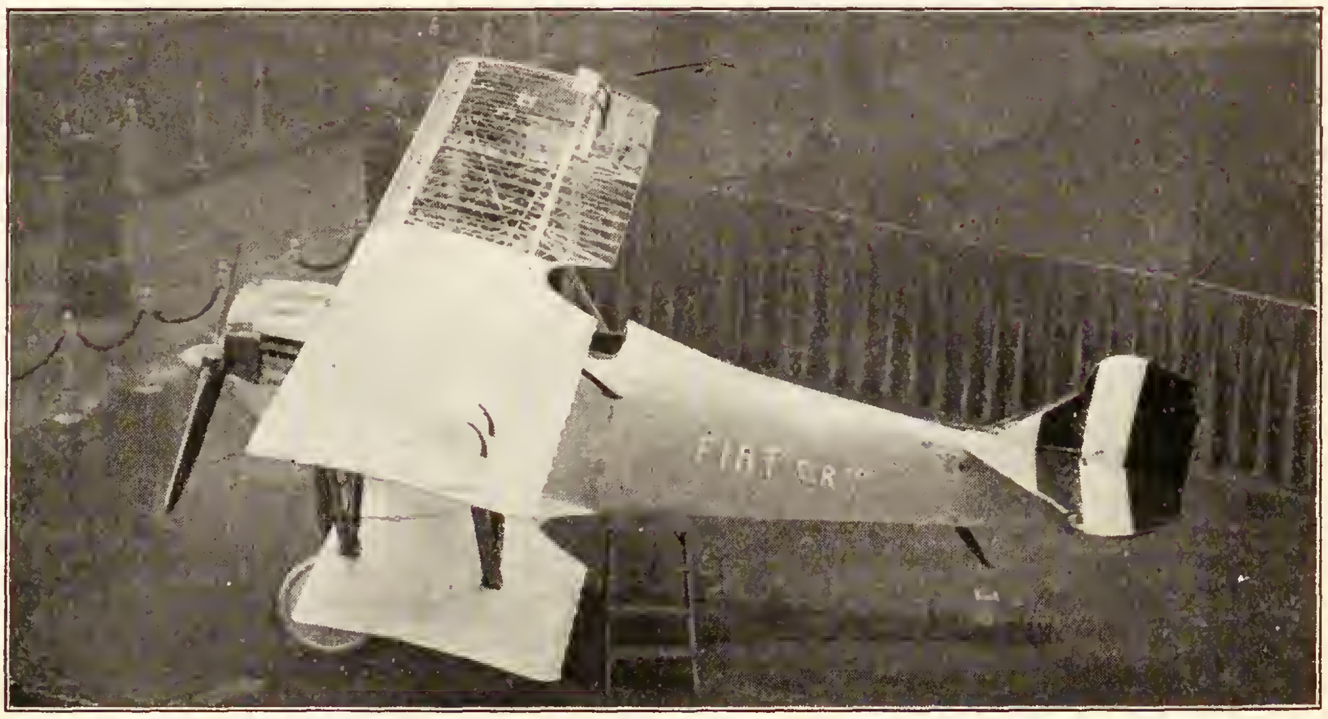
THROUGH a misunderstanding the Fiat single-seater fighter was not included in our advance report of December 2 dealing with the machines exhibited at Paris. It is, therefore, intended to describe it at rather more detail than we have been able to devote to the majority of machines in the present issue.

The Fiat type C.R.20, with 410 h.p. Fiat A-20 engine, is a single-seater fighter of all-metal construction. In its general lines it is of orthodox design, with the possible exception of the somewhat unusual nose radiator (shaped to conform roughly to the V of the engine cylinder banks), and the wing bracing, which is in the form of a Warren truss, no wires at all being employed. One of our photographs this week illustrates the general appearance of the machine. The Fiat, incidentally, was exhibited in what is probably the best manner possible, *i.e.*, one side stripped to the centre line and the other side covered. This is probably a fairly expensive way of preparing a machine for exhibition, but it is undoubtedly a very excellent one. From one side all the detail construction can be inspected, while from the other one may form an idea of the " lines " of the machine. It may be recollected that during the war it was the custom at the Agricultural Hall, Islington, where captured enemy aircraft were exhibited, to strip the machines to the centre line in this fashion.

The construction of the Fiat C.R.20 is of considerable interest, since the form chosen obviously represents an attempt at simplicity coupled with the use of an all-metal structure.

The Fiat C.R.20 is an all-metal single-seater fighter. It was exhibited stripped to the centre line, so that from one side one could see the construction and from the other the " lines " of the machine.

[" FLIGHT " *Photograph*



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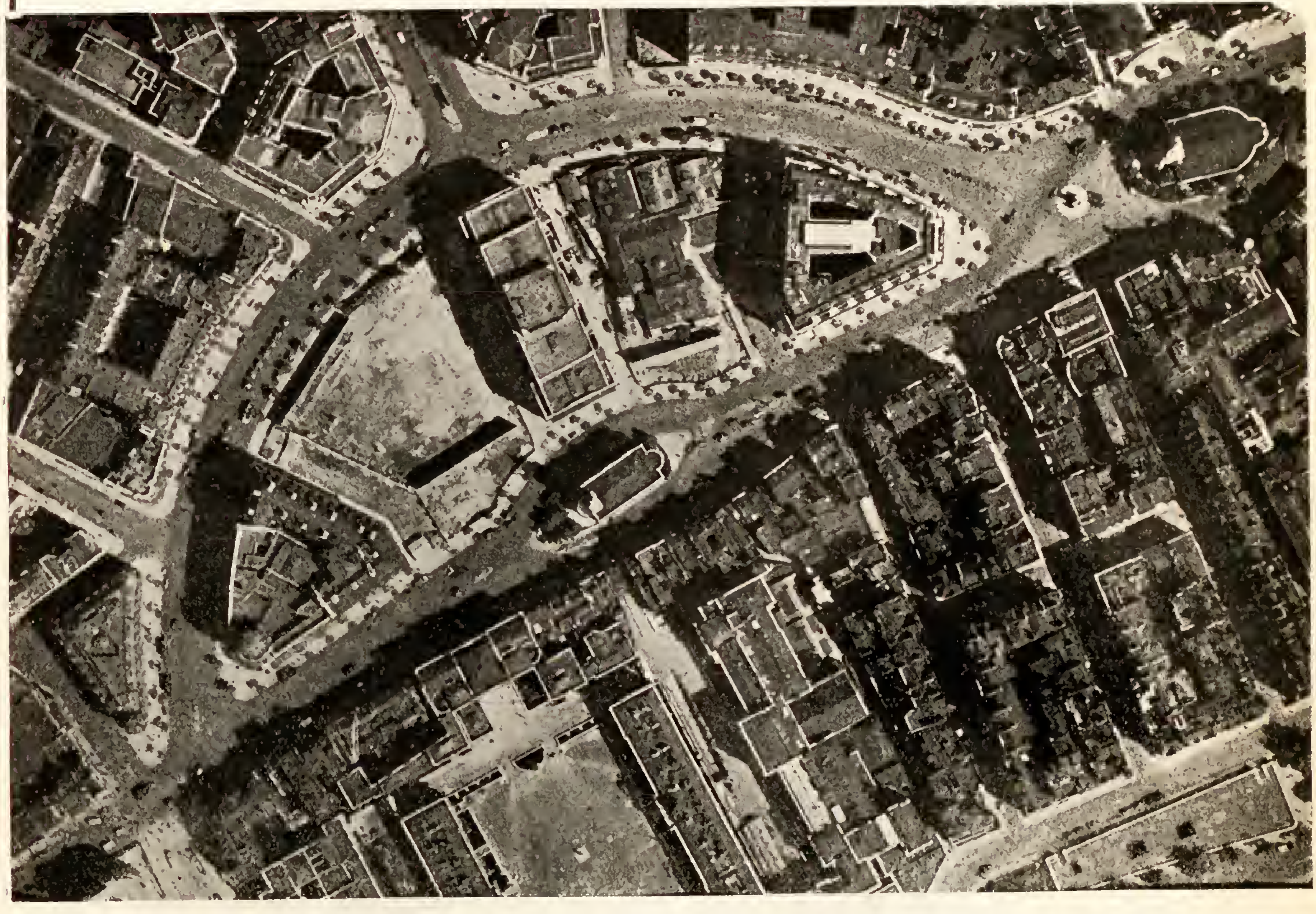
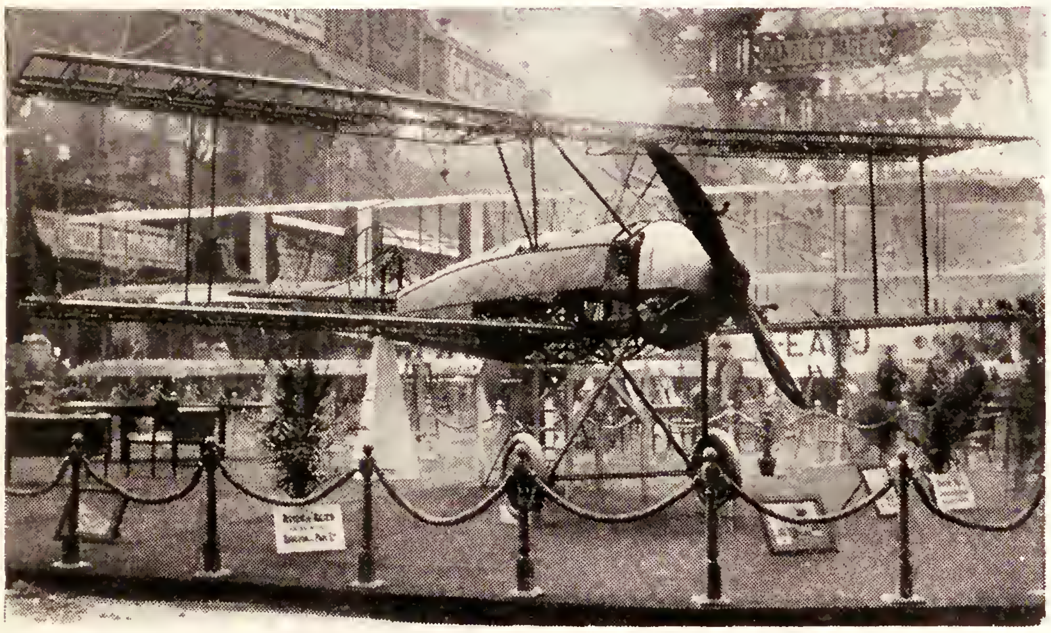


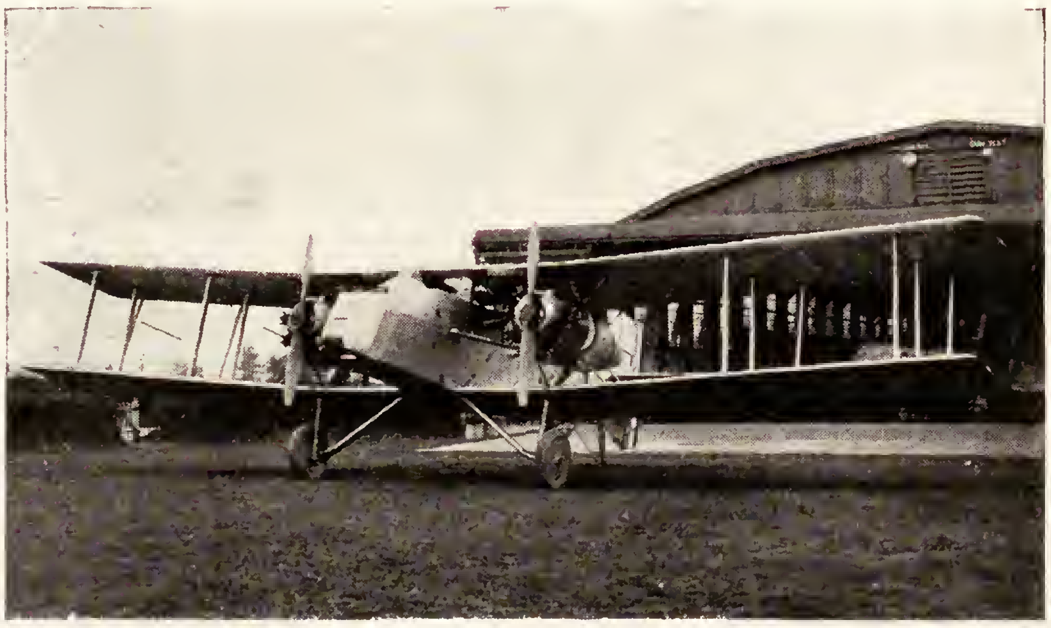
Section of Aerial Photographic Map of London (showing Aldwych and the Strand), which is being undertaken by Aerofilms, Ltd., Scale—25 ins. to the mile (1 : 2500).

PROGRESS



1919

THE Boulton & Paul P.10 Aeroplane, exhibited at the 1919 Paris Show, was the first complete example of modern all-metal construction to be introduced to the public. It compared on very favourable terms with contemporary wooden machines. Developments since that date have consisted not merely in the incorporation of these methods of construction in new types of aeroplanes. In the evolution of new and better constructional features, in the application of constant aerodynamical research to body and wing forms, in the employment of new and better materials, in the improvement of methods of control, in the introduction of safe protective coatings—in these and many other ways, Boulton & Paul aircraft embody not only experience but PROGRESS.



1925

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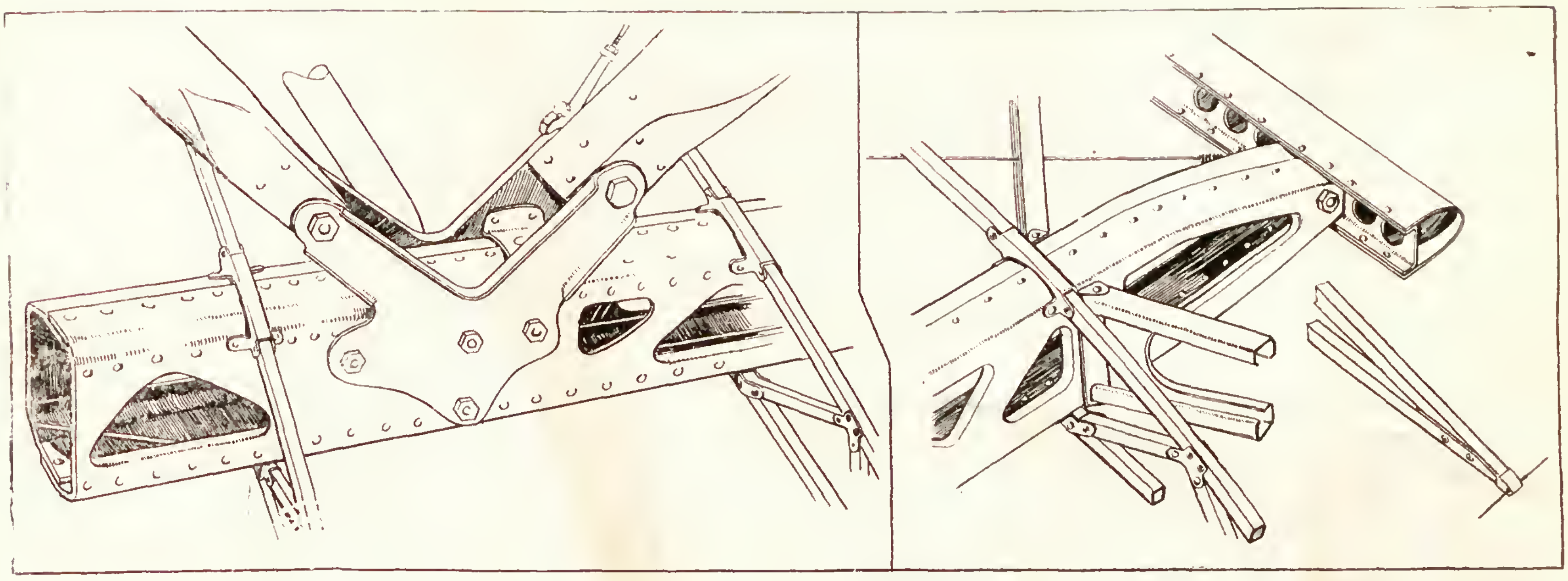


[" Flight " *Copyright*

SOME FIAT CONSTRUCTIONAL DETAILS: On the left, the built-up steel spar. The main section is indicated where spar is shown cut through. Local reinforcement, in the form of internal angle plates, is used at points of interplane strut attachments. The ribs (of Duralumin) are square-section tubes, secured to the spars as shown. On the right, details of wing-tip construction, etc.

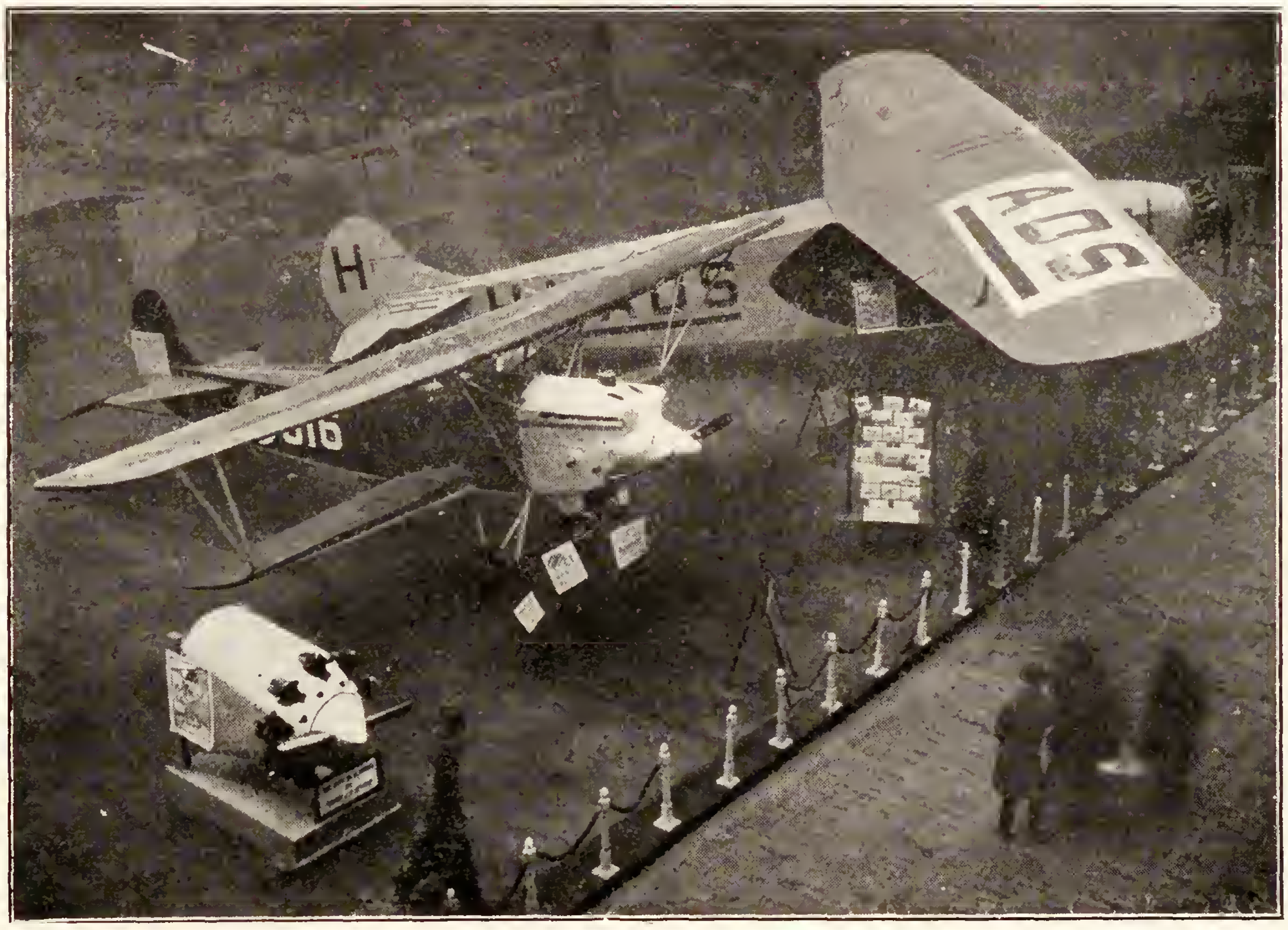
The wings have built-up steel spars, each spar being in two halves, and the overlaps of these halves riveted on the top and bottom centre lines of the spar. The construction, which is probably reasonably cheap, is illustrated by one of our sketches. It would appear doubtful whether with the shallow curvature of the top and bottom spar faces the full strength of the material can be developed before the spar buckles in compression. As a production job, however, there is much to be said for the Fiat spar. The wing ribs are built up from square-section tubes.

The fuselage is of tubular construction as regards its main members, steel being the material used. The secondary structure, however, which is of duralumin, appears to be so intermixed with the main structure that it is difficult to say where one ends and the other begins. The result is that curved formers supporting longitudinal stringers are used at the same time as steadying struts in the fuselage structure. The utility as a strut of a member that is thus initially curved may be questioned. The " bays " in the fuselage are very long (the struts are triangulated in the form of a Warren girder), and the bent formers meet the longerons midway between main strut attachments.

Following is a brief specification of the Fiat C.R.20:—Length o.a., 6·7 m. (22 ft.); span, 9·8 m. (32 ft 2 ins.); wing area, 25·85 sq. m. (278 sq. ft.); weight of machine empty, 940 kg. (2,070 lbs.); petrol, oil, crew, and military equipment, 420 kg. (925 lbs.). Total loaded weight, 1,360 kg. (3,000 lb.); wing loading, 52·5 kg./sq. m. (10·8 lb./sq. ft.); power loading, 3·24 kg./h.p. (7·13 lb./h.p.); " wing power," 15·8 h.p./sq. m. (1·5 h.p./sq. ft.); theoretical ceiling, 9,000 m. (29,500 ft.).; service ceiling, 8,500 m. (27,900 ft.); endurance, 2½ hours at full throttle; speed at ground level, 276 km./hr. (171 m.p.h.); speed at 3,000 m. (9,850 ft.), 264 km./hr. (164 m.p.h.); speed at 6,000 m. (19,700 ft.), 240 km./hr. (149 m.p.h.); climb to 3,000 m. in 6 mins. 41 secs.; to 6,000 m. in 16 mins. 58 secs.

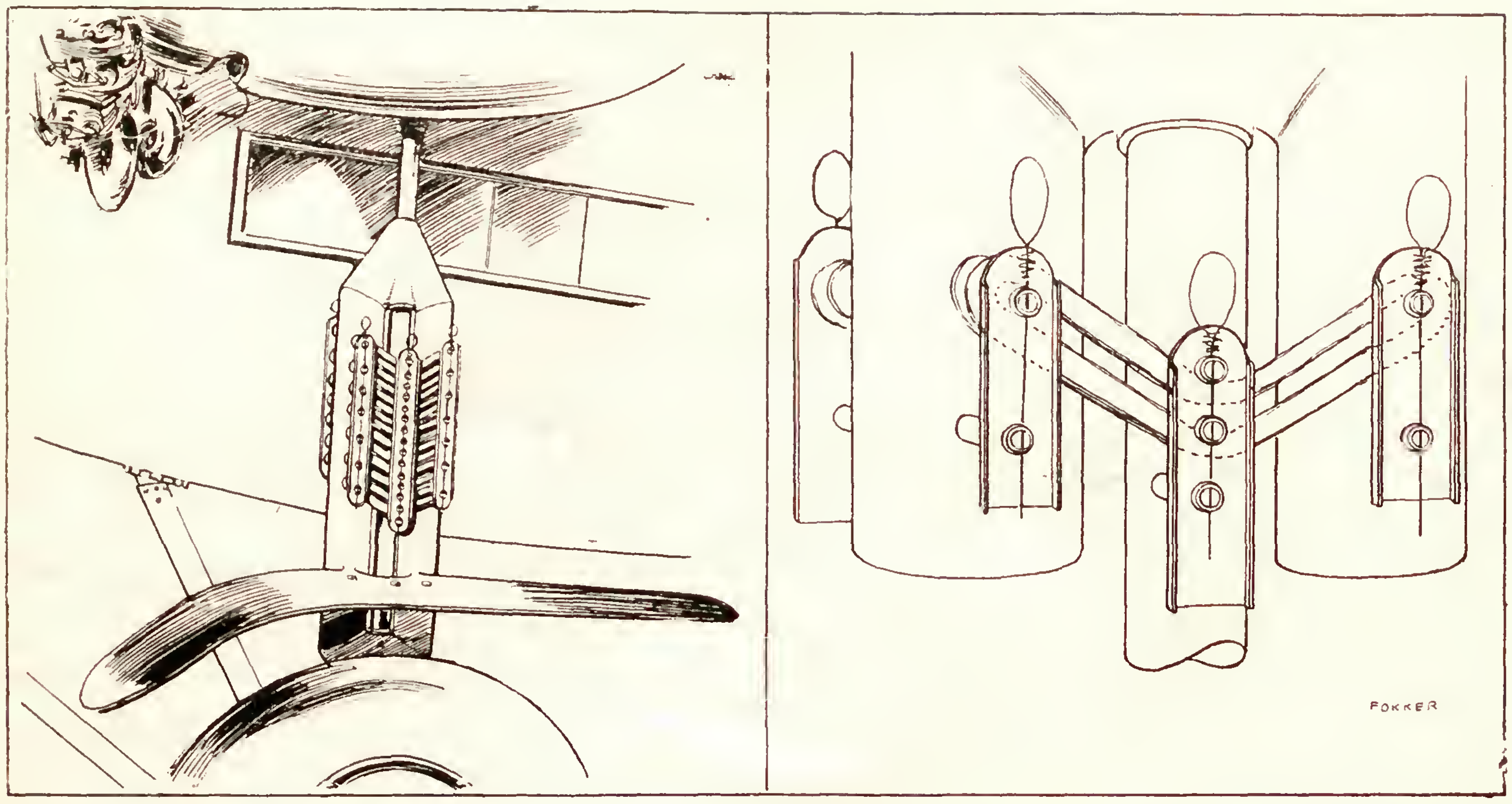
FOKKER

Among their other distinctions the two machines exhibited on the Fokker stand had that of being the only machines to have arrived from their home stations by air, both flying to le Bourget and there dismantled for transport to the Grand Palais. Of the two the C.VD was borrowed at the last moment from the Dutch air service, where it had been in use for a considerable period, and had already done more than 160 hours' flying when it arrived at le Bourget. One would certainly never suspect this from the appearance of the machine which, apart from a few places on cockpit



The Fokker Stand: On the extreme left a "nose" with "Jupiter" engine. Then a C.V.D. with Hispano engine and, on the right, the F.VII 3M with three Siddeley "Lynx" engines.

[" Flight " *Photograph*



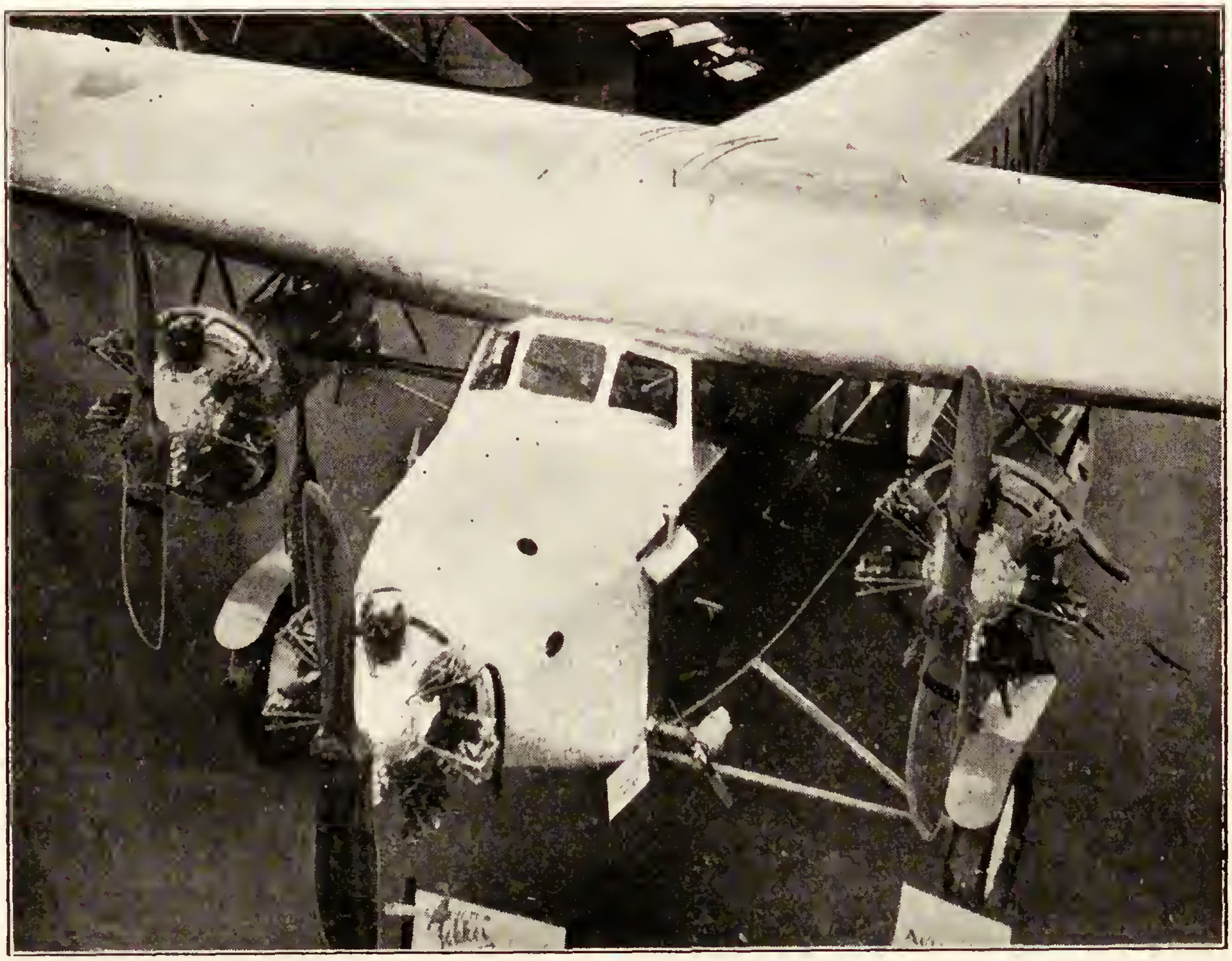
["Flight" *Copyright*

The undercarriage of the Fokker F. VII-3m is unusual. A feature is that individual rubber rings can be changed without disturbing the others. Also the number of rings can be proportioned according to the load which the machine is carrying.

coamings, etc., where the paint had been rubbed off by the crew getting in and out, looks as good as new. Thus, it would seem that the Fokker machines are not only relatively cheap in first cost but are also able to stand up to hard wear—two qualities which do not always go hand in hand. The C.V. is already well known to our readers, and no detail reference seems to be required.

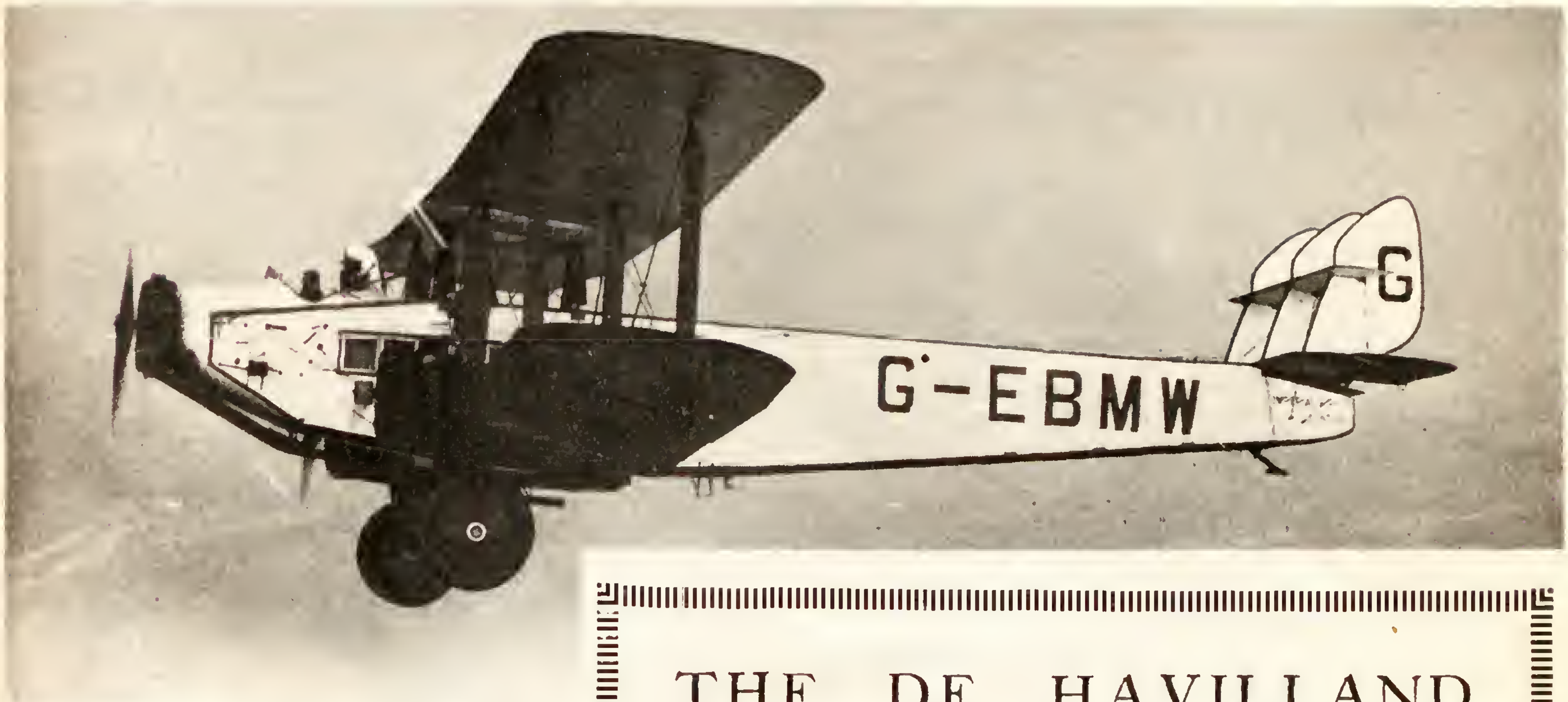
The Fokker F.VII-3m commercial monoplane was seen by many at Paris for the first time, although the type has been used fairly extensively on air line work. The particular specimen exhibited was stated to have been sold to the famous financier Loewenstein for addition to his "stable," which already includes quite a number of different types. The machine is of typical Fokker construction, with welded fuselage and wood wing. The manner of mounting and cowling the wing engines is rather neat, and a feature which is of special interest is the undercarriage which, in point of fact, is not new, having been fitted on the single-engined Fokker monoplanes for a long time. Probably the first time it was seen in England was on the occasion of the anti-stall demonstration by Fokker at Croydon, the machine used for this demonstration having an undercarriage of this type.

The telescopic members of this undercarriage are of welded-up steel tubes (a feature to which some might object, although



This view from above gives a good idea of the power plant arrangement, pilot's cockpit, &c., of the Fokker F.VII-3m.

["Flight" *Photograph*



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The fuselage frame is constructed entirely of steel, the passenger cabin being mounted internally and insulated with sound-proof material.

A large luggage bay is located behind the cabin.

The cabin can be warmed or cooled by the movement of a small lever.

Sufficient fuel is carried for flights up to 525 miles.

The auxiliary starter motor is operated from the pilot's cockpit.

A complete wireless transmitting and receiving set is installed.

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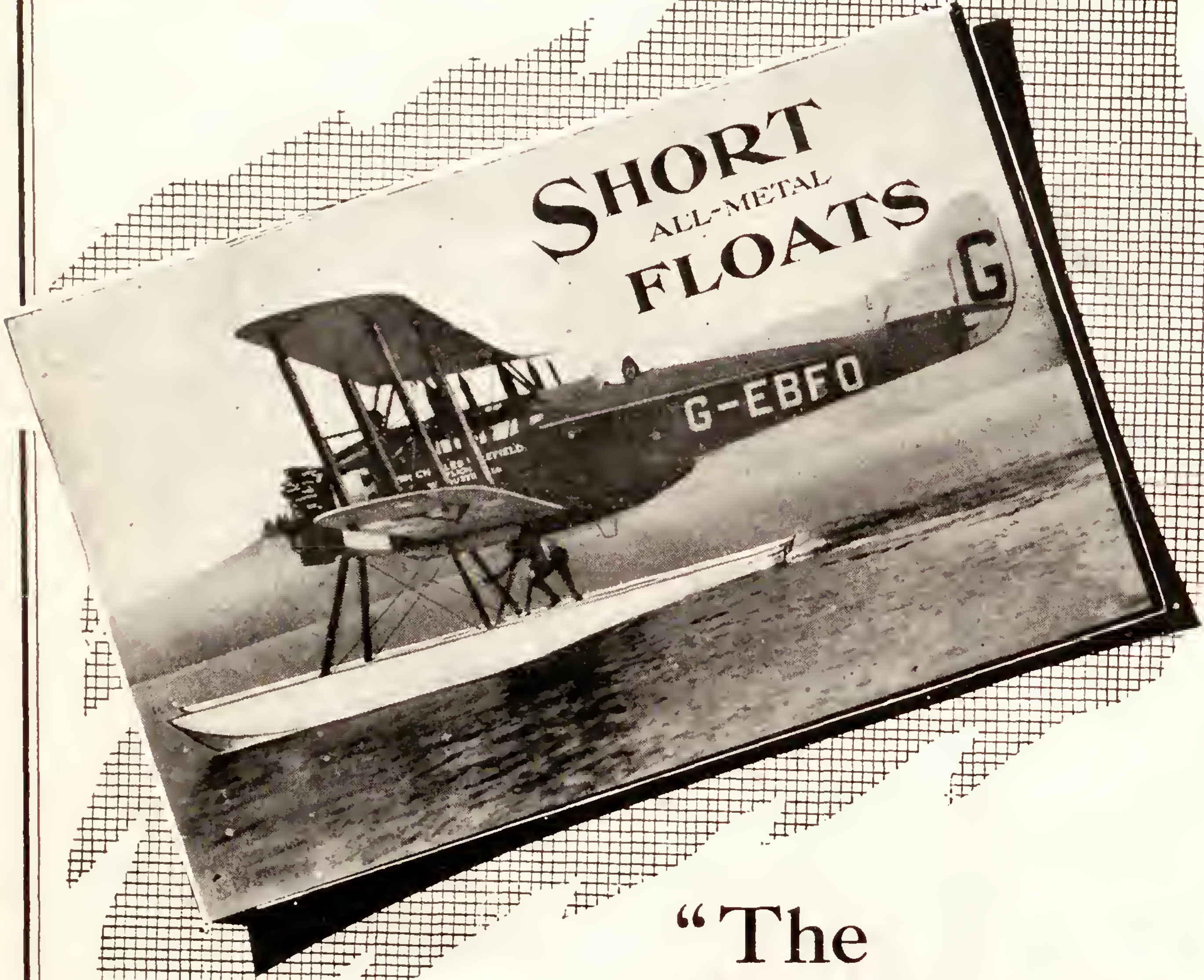
STAG LANE AERODROME, EDGWARE, MIDDLESEX.
Telegrams: "Havilland, Edgware."
Telephone: Colindale 6160.

Top Speed - - 130 *m.p.h.*
Cruising Speed- 110 *m.p.h.*
Span, 79' 6", *Length*, 66' 0",
Height, 18' 0".
Rate of Climb at ground level, 765 *ft./min.*



Referring to his Australia and Back Flight in a De Havilland 50 J machine, fitted with SHORT Floats, Sir Alan Cobham said :—

"The SHORT

ALL-METAL FLOATS

were perfect in design, inasmuch as we were able to get off the water on all occasions with as much as 1,000 lbs. overload, on a machine whose maximum permissible load was about 4,000 lbs. They remained watertight throughout."

In a message to "Flight."

SHORT BROS. (ROCHESTER & BEDFORD) LTD., SEAPLANE WORKS,
ROCHESTER, KENT.

R. M. KINDERMAN
COLLECTION

the undercarriage seems to stand up to its work in practice) and the shock-absorbing medium is in the form of rubber rings of standard size. One of our sketches illustrates the arrangement. It will be seen that individual rings may be removed without interfering with the others. Not only so, but if the machine is to be used with a very light load only (as might sometimes happen) a number of rings can be removed so as to obtain just the right amount of springing. Conversely if the machine is to be used with extra heavy loads, additional rings may be slipped into place. Thus not only can the springing be directly proportioned to the load, but from the point of view of maintenance the undercarriage is about as simple as anything could be.

On the Fokker stand was also exhibited a C.V. "nose" with "Jupiter" engine, demonstrating a special feature of all Fokker machines: that of having easily interchangeable engine units to suit various requirements. Altogether the Fokker stand was one worth a visit, and the fact that Mijnheer Stephan seems able to speak, in addition to his native tongue, French, German, English, Czech, and goodness knows how many other languages fluently, enabled visitors of all nationalities to obtain reliable information with a minimum of trouble. At a show like the Paris exhibition this is a point of no small importance, and is one which it might be well to learn from on this side of the Channel also.

(*To be concluded.*)

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AIRISMS FROM THE FOUR WINDS

Swiss Flight to Africa

Lieut. Mittelholzer, the Swiss pilot, set out from Zurich on December 7, *en route* for Africa, in connection with the scientific expedition to that country, which has already been referred to in Flight. He was flying a Dornier "Mercury" seaplane fitted with a 450-h.p. B.M.W. engine, and was accompanied by M. René Gonzy (geographer and journalist), Dr. Arnold Heim (geologist), and a pilot-mechanic. The object of the expedition is to obtain a photographic record of various sections along the route to Cape Town—which will lie via Cairo, the Nile, Kenya, Belgian Congo, the Zambesi, Beira, Laurenco, Port Natal, and Port Elizabeth—and to study animal life and geological problems, etc. The whole trip is expected to last about three months.

A Flying Club for South Africa

A Flying Club—the first in South Africa—has been formed at Johannesburg. It will be known as the Johannesburg Light Aeroplane Club.

Flight to Brazil Abandoned

Sen. Barros, the Brazilian pilot who has been engaged in an attempt to fly from Genoa to Brazil in a Savoia S.55 flying-boat, has, it is reported, decided to abandon the attempt. He reached Praia, Cape Verde Is., on November 11.

A Spanish-African Flight

The Spanish Atlantic Squadron, consisting of three Dornier-Wal flying boats fitted with Rolls-Royce engines, and under the command of Maj. Rafael Llorente, left Melilla at 8 a.m. on December 10 on the first stage of a flight to Fernando Po, on the west coast of Africa. The pilots of the second and third machines are Capts. Antonio Llorente and Ignacio Jimenez; each machine carries, in addition, two other officers and one mechanic. All three machines reached Casablanca shortly after noon (on December 10). The route to be followed on this flight will be Las Palmas, Port Etienne, Dakar, Konakri, Monrovia, Grand Bassam, Lagos, and St. Isabel Bay. They reached Las Palmas on December 12.

The "Moth's" Eastern Tour

As reported on p. 835 of this issue, in the Lancashire Aero Club's report, Capt. Stack and Mr. Leete successfully accomplished the 200-mile sea crossing from Malta to Homs (or Khoms), Tripoli. From Badir they flew along the coast, and eventually reached Heliopolis (Cairo) on December 12. They left Cairo next day *en route* for Baghdad.

African Air Service Mishap

One of the French air liners on the Toulon-Casablanca air route had to make a forced landing on the beach, near Nerja, Malaga, on December 7. The machine caught fire, and the pilot and one of the passengers were injured.

Capt. Udet in Paris

Capt. Udet, who is well-known to readers of Flight, in connection with the small aeroplanes bearing his name, delivered an address to French airmen in Paris, on December 13. His subject was "Tendencies of German Aviation," illustrated by cine-films of his own flights.

Italian Air Services to Link Up British Route to the East

Sig. E. Boggiano-Pico, the representative of the Italian Aero Lloyd Air Transport Company, has arrived in this country in order to place before the Air Ministry and Imperial Airways, Ltd., plans for regular air services between Zurich and Egypt, via Italy and Greece. Should these materialise the present London-Zurich and the forthcoming Cairo-Karachi air routes would be linked up.

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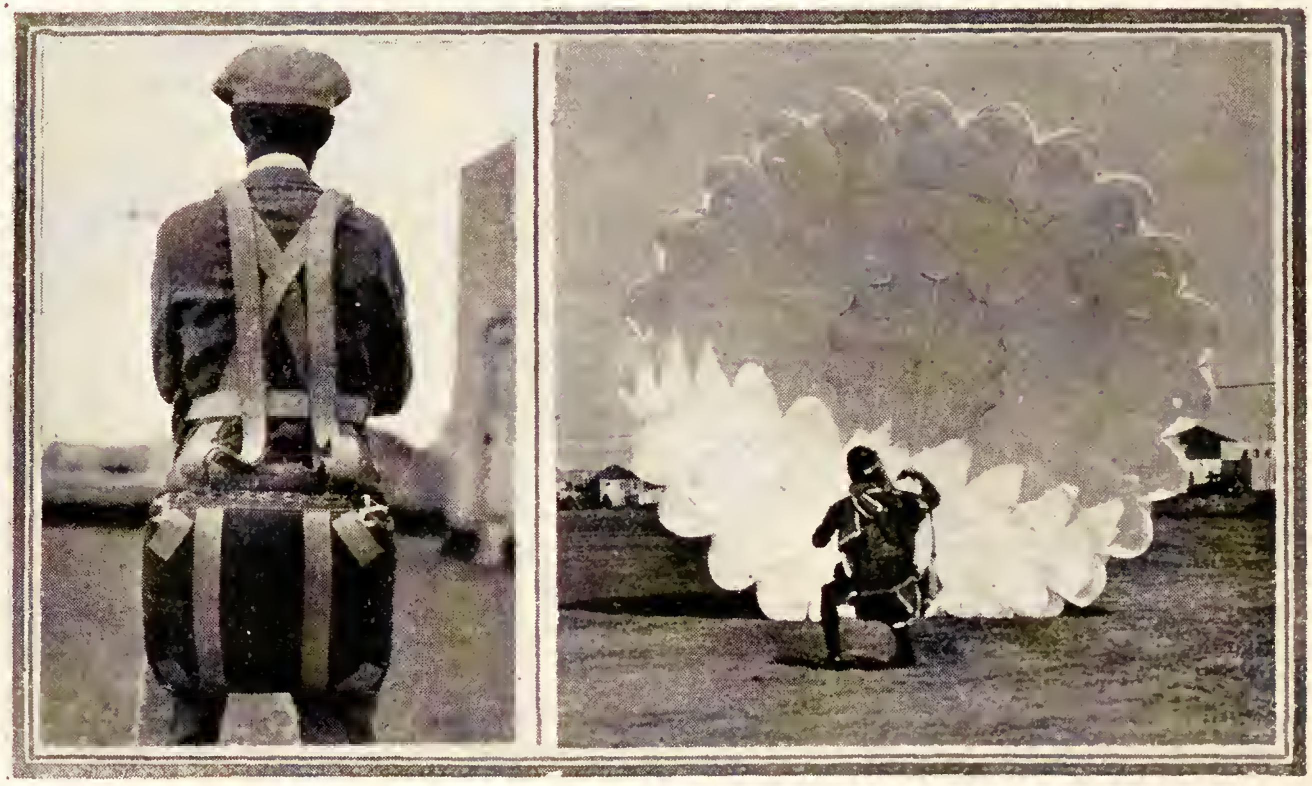

A New American Parachute: Two views of the Russell Automatic Parachute, which has been giving satisfactory results in America. With a dead load of 180 lbs. a 24 ft. diameter 'chute opens in 1⅖ secs., and descends at the rate of 22 ft. per sec.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

COMMITTEE MEETING

A meeting of the Committee was held on Wednesday, December 8, 1926, when there were present: Brig.-Gen. Lord Thomson, C.B.E., D.S.O., in the chair: Mr. Ernest C. Bucknall; Lieut.-Col. M. O. Darby; Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.; Mr. E. J. B. How; Wing-Comdr. T. O'B. Hubbard, M.C., A.F.C.; Col. F. Lindsay Lloyd, C.M.G., C.B.E.; Lieut.-Col. Sir Francis K. McClean, A.F.C.; Lieut.-Col. M. O'Gorman, C.B.; Mr. T. O. M. Sopwith, C.B.E.; and the Secretary.

Election of Members.—The following new Members were elected:—

Group-Capt. Edward Featherstone Briggs.
Robert Arthur Chalmers.
Frederick Scott Clark.
Lord Ossulston.
Henry George Simms.

Aviators' Certificates.—The following Aviators' certificates were granted:—

8053.	Oliver Edwin Simmonds ..	November 28, 1926.
8054.	Edmund Kell Blyth	November 30, 1926.
8055.	Thomas Herbert Ottewill Richardson	October 18, 1926.
8056.	George Watson	December 4, 1926.

F.A.I. Paris Conference.—The Committee considered the following questions to be discussed at the Paris Conference on December 16 and 17, 1926:—Special classification of records for women pilots; height records; high-speed records; valuation of aircraft for custom purposes; classification of aircraft for records; Schneider Cup regulations.

The following delegates were appointed to represent the Club: Lieut.-Col. M. O'Gorman, C.B., Capt. C. B. Wilson, M.C., and H. E. Perrin.

Association of Aero Clubs.—The scheme for the formation of a General Committee of Aero Clubs in Great Britain was considered and approved for submission to the various Aero clubs.

London Aeroplane Club.—The report of the year's working and accounts were submitted. The Committee considered the results achieved were most satisfactory, and a unanimous vote of thanks was passed to the committee and staff of the London Aeroplane Club.

House Committee

A meeting of the House Committee was held on Monday, December 6, 1926, when there were present: Mr. Ernest C. Bucknall, in the chair; Maj. Herbert J. Corin, Mr. E. J. B. How, Mr. D. C. MacLachlan, and the Secretary.

Christmas Closing.—It was decided that on Christmas Day, Sunday and Boxing Day, December 25, 26 and 27, 1926, luncheons, dinners, and teas should not be served and the bar be closed, breakfasts only being served to members staying in the club.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

During the past week, the fog was responsible for three blank days. The total flying time was 21 hrs. 20 mins.

The following Members had flying instruction:—D. L. Stally, A. J. Richardson, H. S. Spooner, H. Solomon, J. A. Simson, J. G. Crammond, E. A. Lingard, J. J. Hofer, Miss Spooner, R. Malcolm, C. G. Miesagaes, G. C. Bonner, M. H. Samuelson, E. J. B. King, Miss Fletcher.

The following members made solo flights:—D. P. Esler, O. J. Tapper, H. S. Spooner, J. A. R. Stevenson, G. C. Bonner, D. Kittel, G. Terrell, N. Jones, Lady Bailey, W. L. Macleod, W. Hay, G. H. Craig, S. O. Bradshaw, C. E. Murrell.

During the week W. L. Macleod and H. Spooner passed the tests for their Aviators' Certificates.

The following members were given joy rides:—Mrs. Matthews, E.R.Wilson, Miss Wilson.

The Club has arranged to take over a D.H. "Moth" to replace G-EBNP, which was recently crashed.

Lancashire Aero Club

Report for week ending December 11.—Total flying time for the week, 12 hrs. 50 mins., made up as follows:—Dual with Mr. Brown:—Messrs. Wade 1 hr. 5 mins., Dickinson 1 hr., Twemlow 45 mins., Stern 40 mins., Miss Brown 45 mins.; Messrs. Wilson and McNair 35 mins. each, Shiers 30 mins., Parker 25 mins.; Miss Emery 25 mins.; Messrs. Slater and Newton 20 mins. each; Moore and Prince 10 mins. each; Costa 15 mins.

Solo:—Messrs. Twemlow 1 hr. 15 mins., Lacayo 50 mins., Leeming 40 mins., Costa 35 mins., Goodfellow 15 *mins.* Test flights:—1 hr. 15 *mins.*

The nature of the weather may be gathered from the fact that not a single joy-ride has been given during the week. Incidentally, the said atmospheric conditions have lost the club £10, for Mr. Blagden, who has been waiting patiently for 10 days for a gap in the clouds to enable him to do his "A" Licence height test, has now left the Manchester district without being able to carry it out.

The following extract from a letter written by Mr. Stack at Malta may be of general interest:—" . . . we have managed to find Malta after leaping off Sicily into space, so to speak. We have had the most unfortunate weather—rain, gales, thunder and mist down the Rhone valley—anything, in fact, but a following wind and fine days. We have been held up everywhere, but are slowly pushing on. The two best trips we have made so far have been from Marseilles to Pisa, 300 miles in 4½ hrs., and then from Capua (Naples) to Malta, 470 miles in 6½ hrs. Our next leap off will be to cross the spot of neat water to the African coast. We had rather a rough trip from Paris to Lyons. When we left Paris the weather was not too bad, but a strong head wind was blowing, and by the time we reached Dijon we were flying through rain and thunderstorms. The wind got up to nearly half a gale and we had to fly at about 300 ft. in order to follow the river. Eventually, when about 60 kms. from Lyons, it became so dark that we could not see our maps, and had to just follow the river. After a time the lights of Lyons showed up, but we could not see anything in the nature of aerodrome lights. Luckily I knew the position of the aerodrome and managed to find it, but could only make out the roofs of the hangars and a large white landing T. We made landings of sorts, and then got out and walked to the hangars, as it was too dangerous to taxi our kites in owing to the oarkness. The staff rushed out in ears and said they thought we would have crashed, and explained that they had no lights, as all their electric cables had been blown down by the storm of the day before." (Apparently the aerodrome manager forgot that there are such things as petrol flares!) Since writing the foregoing, both Stack and Leete have safely crossed the 250-mile "spot of neat water" referred to, and have reached Cairo, after covering well over 2,000 miles from their starting point, the last 1,000 miles having taken them only four days.

Meanwhile, all (except the weather, of course) is in readiness for Mr. Leeming's mountaineering flight, in connection with which the following rude verse has been received from some low fellow who seeks the cloak of anonymity:—

> " Our Leeming had an Avro with great big wheels on
> And a very special engine that was Avro's joy and pride,
> And daily he would take it up
> And put it down and shake it up
> And land it on a handkerchief, till all the papers cried:—
> This is John Leeming—Attaboy!
> This is John Leeming—Have a care!
> There is'nt any tellin'
> He might land upon Helvellyn,
> So look out! take cover! beware!"

The Hampshire Aeroplane Club

Report for week-ending December 9:—Total flying time, 8 hrs. 41 mins. passenger flying, 5 hrs. 25 mins.; solo flying, 3 hrs. 16 mins.

The following members received instruction:—Lt. Graham, R.N., 20 mins.; Lt. Heinman, R.N., 50 mins.; Messrs. Sheppherd, 15 mins.; Kerry, 25 mins.; Southcliffe, 50 mins.; Molony, 25 mins.; Stokes, 8 mins.; Rumble, 12 mins.; Cooper, 50 mins.; Keeping, 50 mins.; Vaughan, 20 mins.

The following members flew solo:—Messrs. Keeping, 25 mins.; Rumble, 25 mins.; Jones, 15 mins.; Perfect, 46 mins.; Simmonds, 5 mins.; Bowen, 5 mins.; Fry, 5 mins.; F/O. Mellor, 35 mins.; Lt. Graham, R.N., 35 mins.

The Midland Aero Club, Ltd.

Report for week ending December 11:—The total flying time was 5 hrs. 5 mins.

The following members made solo flights:—J. Brinton, G. V. Perry, E. J. Brighton, C. L. Knox, R. L. Jackson. Mr. O. L. Richards was given dual instruction.

Fog throughout the week considerably restricted flying.

The first Midland Aero Club Dance was held at the Palace Ballroom, Erdington on Thursday. It was a most enjoyable affair and was well patronised.

The Yorkshire Aeroplane Club

Report for the week ending December 10.—The total time flown was 5 hrs. 35 mins. made up as follows:—2 hrs. 15 mins. dual, and 3 hrs. 20 mins. solo.

Messrs. Mann, Marshall, Oglesby and Watson had dual ; while Messrs. Dawson, Lax, Mann and Watson went solo. There were 14 flights.

On Saturday, December 4, we were favoured with a really fine day, with the result that two of our members, Messrs. Lax and Watson, under the watchful eye of Mr. Loton, successfully passed the flying tests for their "A" Licence.

In the course of the altitude test Mr. Watson reached 6,500 ft., but Mr. Lax, to make doubly sure, was not content to come down until the 7,000 mark had been attained. At the conclusion of each test one saw Mr. Loton, complete with foot rule, taking precise measurements from the fixed point, and his mind was still somewhat uneasy as to whether one of the turning points (a haystack in this case) had been accurately rounded on each of the figure-of-eight-turns. In future, if we supplied him with a theodolite and could procure the services of someone willing to float a captive balloon immediately above the aforesaid haystack it would save him a lot of worry and incidentally a stiff neck!

As the Aerodrome was again enveloped in a thick fog during the whole of Sunday, it was impossible for any of the others to attempt the tests, so that they will now have to be content to postpone them until after the Christmas vacation, when Mr. Loton will be back from London.

The Club will close down for Christmas on Tuesday evening, December 21, and will re-open on Wednesday, January 5, 1927.

THE H.G.

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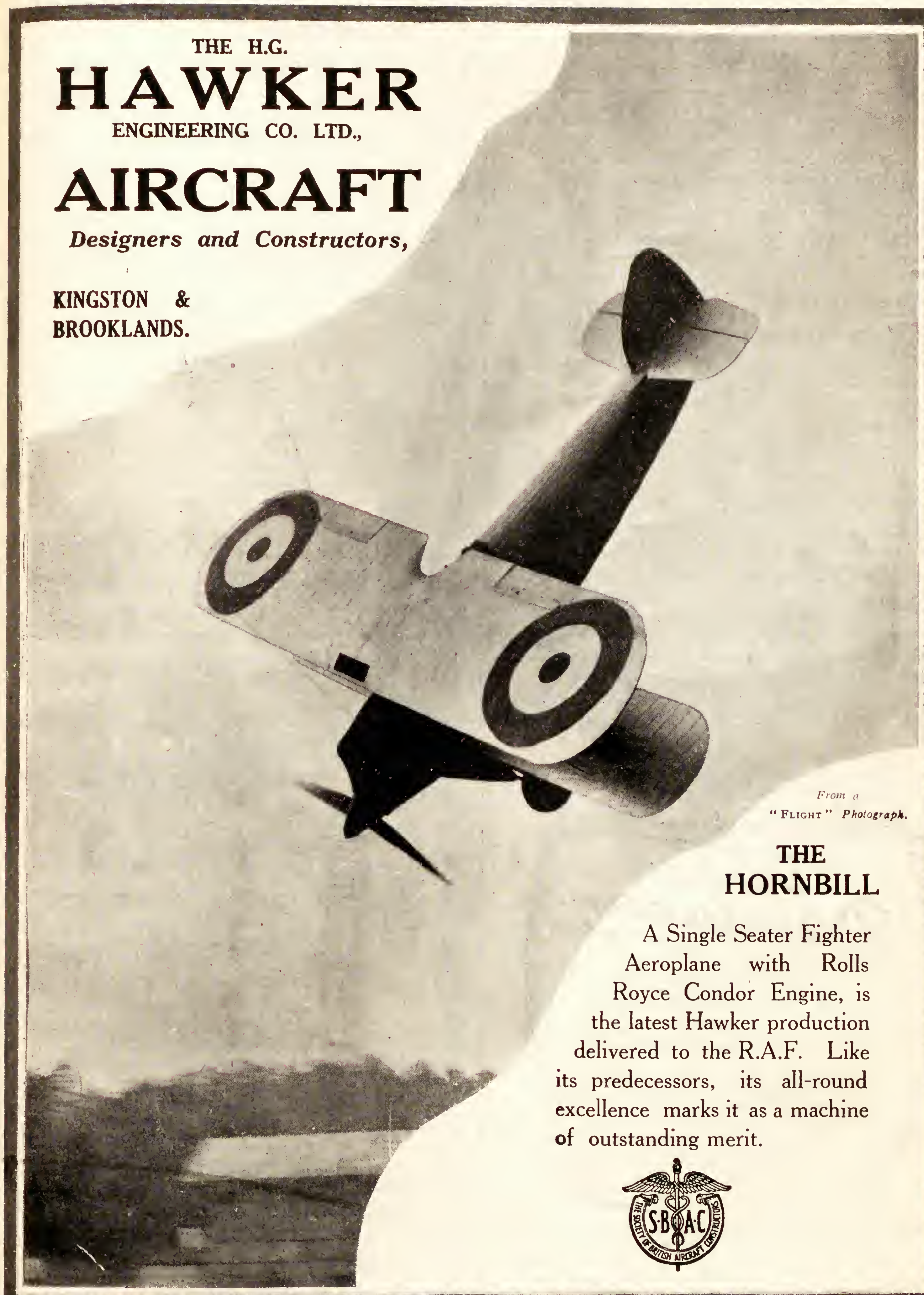

From a "FLIGHT" *Photograph.*

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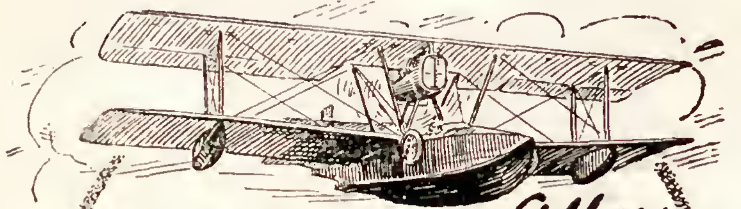

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is a product resulting from inside knowledge of the duties required, and of what is absolutely necessary in this vital part of an aeroplane.

On Air Ministry —List.—

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THE AIR ROUTE TO INDIA

Wireless Equipment on the De Havilland Air Liners

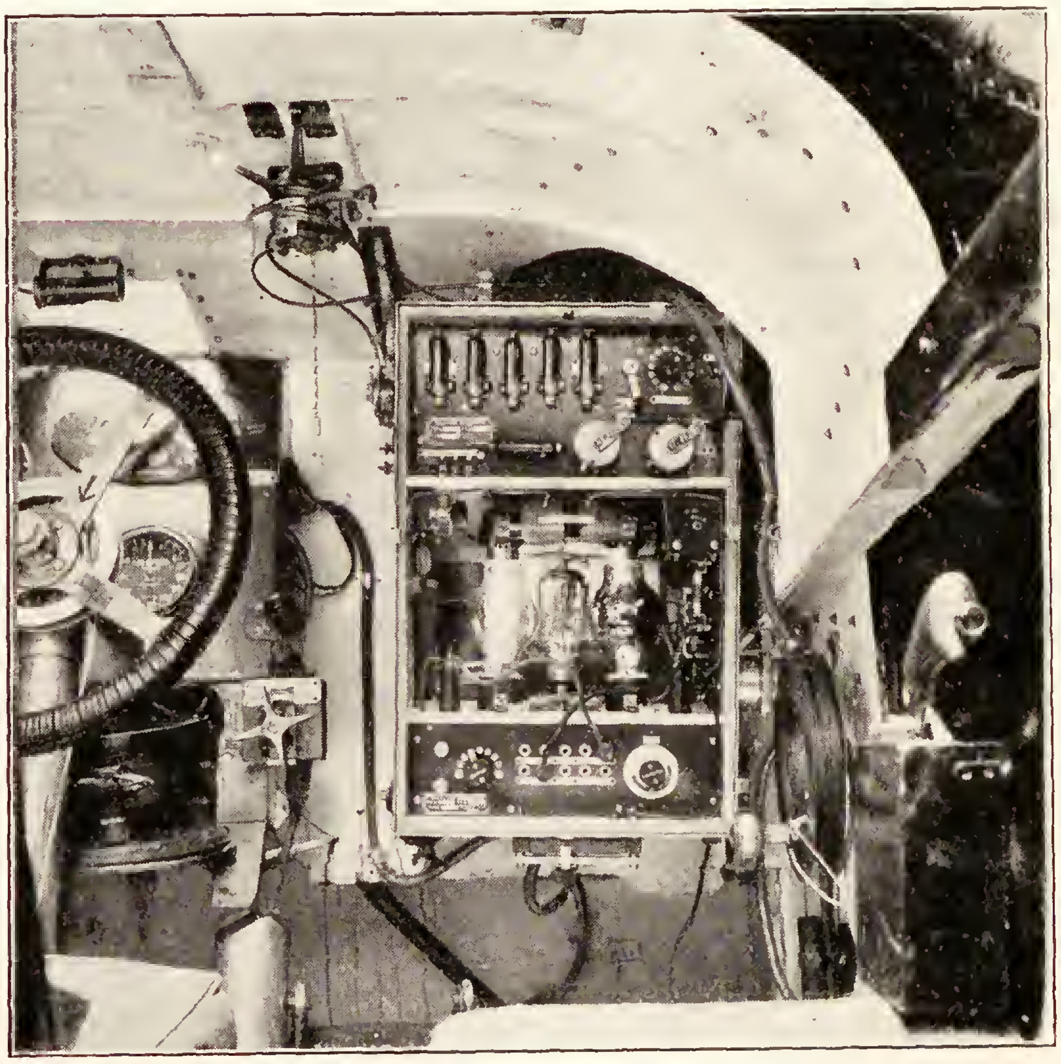
During his recent flight to Australia Sir Alan Cobham emphasised the importance to long distance commercial flying service of good ground organisation, wireless communication, and weather reports. These details are being very carefully organised in connection with the new air route to Egypt and India which is being opened by Imperial Airways at the beginning of next year. The giant DH 66 multiple-engined aircraft, described in Flight for July 10 and November 4, last, which will fly on this route will be fitted with the latest type of Marconi 150-watt, All-Purpose, Telephone-Telegraph Aircraft Equipment, Type AD 6, so that they may be in constant touch with ground stations throughout the journey. These installations have been especially modified to suit the conditions existing on this new route. The most interesting development is the employment for the first time of a generator which provides power both for the internal and external lighting of the aeroplane and for the wireless installation. In the past these two requirements have always been treated separately with the consequent provision of two generators, and therefore additional "head resistance."

The generator employed will incorporate other special features inasmuch as it will be driven by a newly-designed, automatic, constant-speed propeller which will maintain the voltage of the machine constant, under varying conditions of load, over an air speed range of approximately 60 to 130 miles per hour. Moreover, in the unlikely event of a forced landing being necessary the same generator can be used to supply emergency power to the transmitter either by the use of the battery normally used for lighting, or, alternatively, if it is desired to work for long periods, by means of a special coupling arrangement to the small petrol engine used for starting the main engines.

Thus even if a machine were forced to land in the solitudes of the desert country which is to be found along almost the entire route, it would be an easy matter to establish wireless communication with the nearest ground station and obtain any required assistance.

The AD 6 set is arranged to work on Telephony or Telegraphy up to ranges of 300-400 miles, and since a chain of Marconi Aerodrome ground stations is being established by the Air Ministry and the various governments concerned at frequent intervals throughout the route the machines will never be out of calling distance of a wireless station.

The wireless requirements of this route have been the subject of very careful consideration by the authorities concerned, and it can safely be stated that the system of communications provided both for the ground and in the aeroplanes will render the Cairo-Karachi route among the safest in the world. A general idea of the installation may be obtained from the above illustration of an A.D.6 set in the Handley Page W.9 air liner.



THE MARCONI TYPE A.D.6 WIRELESS INSTALLATION: Our picture shows this important equipment as fitted in the Handley Page W.9 "Hampstead" of Imperial Airways. On the right will be seen the aerial coiled up on its winch, next to the instrument box (normally completely enclosed) which contains both transmitter and receiver. The remote control switches will be seen to the right of and above the steering wheel. This installation will be fitted, specially modified, in the D.H. 66 Cairo-Karachi machines.

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French Madagascar Flight

Lieut. Bernard, who succeeded in flying from Marseilles to Madagascar via Central Africa, started on his return flight on December 11, when he crossed to the mainland at Mozambique. On the trip home he will follow the Great Lakes and Nile Valley route.

Italian Air Accidents

Official figures of the Italian Air Ministry show that in eleven months ended October 31 there were twenty military aeroplane accidents, resulting in twenty-two persons being killed and four seriously injured.

Aero Golfing Society

The Annual Dinner of the Aero Golfing Society will be held at the Royal Aero Club on December 30, at 7 for 7.30 p.m. Dinner 7*s.* 6*d.* Morning dress. Members of the Aero Golfing Society who are not members of the Royal Aero Club, will be elected honorary members for the day.

The Annual Meeting of the Society will be held during the dinner, when the new captain will be elected. *It is hoped that all members will make a special effort to be present.* Members are requested to notify the Secretary beforehand that they will attend.

The Royal Air Force Club

The Royal Air Force Club will be closed for the Christmas Holidays from midnight on Christmas Day, until 5 p.m. on Tuesday, December 28, except in so far as affects bedroom accommodation (with breakfast only) to residents and members who have engaged bedrooms prior to noon on Christmas Day.

H.M. Aircraft Carrier "Argus."

Commissioned on November 23 for trials, after a long refit, the aircraft-carrier *Argus* (Captain A. R. Palmer) is to pay off and temporarily recommission with a reserve crew at Chatham on December 21, before recommissioning for service in the Atlantic Fleet, in which she was replaced by the *Furious*. This Fleet will then have two carriers, like that in the Mediterranean, although at the moment one of the two in the latter Fleet, the *Hermes*, has been lent to the China Station.

INSPECTION OF FLIGHT CADETS, CRANWELL

On December 10, Air Chief Marshal Sir Hugh Trenchard, Chief of the Air Staff, made the passing-out inspection of Flight Cadets at Cranwell Cadet College. Air Commodore F. C. Halahan, Air Officer Commanding, in his report, states that at the present time there are 117 Flight Cadets under training, viz.—(*a*) IV Term, 32; (*b*) III Term, 19; (*c*) II Term, 32; (*d*) I Term, 34. During last term, a total of 1,492 hrs. 55 mins. flying, under the various classes, was carried out.

The IV Term, who are now due to pass out and are recommended for commissions, number 32. The average flying time of these cadets is 75 hrs., of which 23 are solo on Service type. (Machines used are Avro, Bristol Fighter, D.H. 9a, and Snipe.) The following awards have been made:—

The Sword of Honour, presented to the best all-round Flight-Cadet in the Senior Term, has been awarded to Flight-Cadet J. Clarke.

The R. M. Groves Memorial Prize, for the best all-round pilot in the Senior Term, to Flight-Cadet J. Clarke.

The Abdy Gerrard Fellowes Memorial Prize, for the Flight Cadet obtaining the highest total marks in Mathematics and Science, has also been won by Flight-Cadet J. Clarke.

The Air Ministry prize in Humanistic subjects has been awarded to Flight-Cadet W. C. Cooper.

The Air Ministry prize in Aeronautical Engineering also goes to Flight-Cadet J. Clarke.

Flight-Cadet Clarke, who thus gains four out of the five awards, is an ex-aircraft apprentice belonging to Carlisle. He was educated at Dalton Grammar School, Dumfries, and at the R.A.F. Aircraft Apprentice School at Halton. He was one of the three selected, in December, 1924, on completion of the 1921 Aircraft Apprentice course, to proceed to the R.A.F. Cadet College, Cranwell, as a Flight Cadet, with a view to becoming a permanent Commissioned Officer in the R.A.F.

Flight-Cadet Cooper is also an ex-aircraft apprentice, from the Electrical and Wireless School, Flowerdown.

The report regrets to have to record the death, as the result of a flying accident, of Flight-Cadet D. G. Harcourt-Wood. This is the fourth fatal accident which has occurred since the formation of the Cadet College in February, 1920, since when 279 cadets have passed out from the College.

Commenting on the various branches of training, the Report states: In aeronautical engineering it is noticeable that cadets, on the whole, do not attach sufficient importance to engineering subjects. The experiment of thesis-writing on aeronautical subjects is proving successful. In wireless telegraphy a higher standard of efficiency could be reached in Morse. Considerable keenness has been displayed in musketry. Further instruction has been given in parachute folding and packing, and all cadets have been provided with parachutes. During the present term the discipline has been good, and the health of the cadets continued to be excellent.

The inspection opened with a drill parade and march past, Sir Hugh taking the salute, after which an examination of the workshops, etc., was made, followed by a flying parade carried out by the Cadets.

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ROYAL AERONAUTICAL SOCIETY

Official Notices

An extraordinarily attractive and interesting programme of lectures has been arranged for the second half of the lecture session of the Royal Aeronautical Society.

On January 6 Major B. C. Carter, A.R.C.Sc., D.I.C., A.F.R.Ae.S., will lecture on "Dynamic Forces in Aircraft Engines." This lecture will deal in a practical way with many of the vibrational and similar difficulties met with in aero engines and suggested ways of combating them.

Mr. H. Glauert, M.A., F.R.Ae.S., on January 20, will lecture on "The Theory of the Auto-giro." He will produce test figures to substantiate his arguments and will throw a flood of light on many controversial points connected with Senor de la Cierva's amazing invention. This lecture will undoubtedly attract a gathering of the experts, both practical and theoretical, and will go a long way towards substantiating or otherwise the claims made for this remarkable machine.

Mr. A. H. R. Fedden, F.R.Ae.S., is so well known as one of the leading authorities on engines that he needs no introduction. He will lecture on February 1 on one of the most important problems of present aero engine design, "Supercharging for Aero Engines." This is one of those joint lectures which have proved so successful in the past, with the Institution of Automobile Engineers. Mr. Fedden has had a practical experience of his subject second to none in this country.

Major R. H. Mayo, O.B.E., F.R.Ae.S., well known as the technical adviser to Imperial Airways, will speak on February 17 on a subject which is of first-rate importance to the future of civil aviation in this country. The subject of his lecture will be "The Design and Operation of Commercial Aircraft."

On March 3 Mr. L. W. Bryant, B.Sc., A.R.C.Sc., A.F.R.Ae.S. will give his lecture on "The Spinning of Aeroplanes," a subject he has made peculiarly his own.

Mr. M. A. Giblett, M.Sc., will lecture on March 17 on "Line Squalls." The study of meteorology is one which has not been always as fully emphasised as it should be from an aviation point of view, and Mr. Giblett's lecture will widen considerably present knowledge on the subject he has chosen.

The importance of model experiments is one which cannot be exaggerated, and Mr. E. G. Richardson, M.Sc., Ph.D., will emphasise this and point out the value of such experiments on design and stability in his lecture on "Recent Model Experiments in Aerodynamics," which he will deliver on Thursday, March 31.

Major R. E. Penny will lecture on April 28 on "Seaplane Design," and as one who has been intimately connected with the design of seaplanes for many years, his lectures will be one of great practical value.

In May there will be read the Wilbur Wright Memorial Lecture, one of the outstanding lectures of each year. The lecture for 1927 will be by one who is perhaps the best-known authority on aerodynamics in the world, Prof. Prandtl, of Gottingen University. Prof. Prandtl will deliver his lecture in English.

Data Sheets

Arrangements have been made for the issue, early in 1927, of data sheets. These sheets will contain abstracted information of use to ground engineers, draughtsmen, and all those engaged in the practical side of the industry. These data sheets will be issued at frequent intervals, and it is to be hoped that all those who wish for such information will write to the Secretary, so that those sheets for which there is a demand are printed as soon as possible.

The data sheets will be printed on an 8 by 5 in. page, convenient for notebooks, with a wide left-hand margin for insertion in the notebooks. They will enable anyone in the industry to collect together, in a convenient, condensed and usable form much of the information now scattered in various works of reference, B.E.S.A. specifications, private notebooks, and the like.

It is hoped that those who have any specialised or unpublished information of any kind which would prove useful to other members of the industry, will communicate with the Secretary, with a view to its publication.

The data sheets will be issued to all members of the society upon application. Any further information with regard to them can be obtained on application to the Secretary.

Visit to Hawker Engineering Co.

On Saturday, December 18, a visit has been arranged for students and other members of the society to the works of the Hawker Engineering Co. at Kingston. The Hawker Co. are famous for their Heron all-metal single-seater fighter, the Woodcock night fighter, the Hornbill, the most powerful machine of its type in the R.A.F., and the Horsley. The visit will not only prove interesting and instructive, but will enable those who attend it to visualise what mass production is and what the future holds for the aeroplane industry. Any who wish to attend should communicate immediately with the Secretary of the Society.

J. Laurence Pritchard,
Honorary Secretary.

THE ROYAL AIR FORCE

London Gazette, December 7, 1926

General Duties Branch

The following Flying Officers are granted permanent commns. in rank stated (Nov. 1) :—T. G. Bird, W. E. Purdin.

The following Pilot Officers are promoted to rank of Flying Officer :—L. Dalton-Morris ; Aug. 25. C. H. Roberts (Lieut., A. and S. Highlanders, R.A.R.O.), E. E. Fallick ; Oct. 14. J. R. Addams ; Oct. 26. V. C. Taylor ; Oct. 31. Pilot Officer on probation, B. J. Bushe-Caryesford, is confirmed in rank ; Nov. 22. Flight-Lieut. J. S. Chick, M.C., A.F.C., is placed on half-pay, scale B, from Dec. 9 to 22, inclusive ; Flight-Lieut. T. S. James is transfd. to the Stores Branch on probation with effect from Nov. 27, and with seniority as a Flight-Lieut. of Jan. 1, 1923.

The following are transfd. to Reserve :—

Class A.—Flight-Lieuts. H. Bligh, L. G. Paget, A.F.C., R. C. Preston, A.F.C. ; Dec. 5. Flying Officers F. H. Bugge, B. A. de Nevers, K. H. Holley, H. N. V. Le V. Noel, D.F.C., R. C. Pretty ; Dec. 5. E. S. Brinsmead, F. Larman, F. B. Robinson ; Dec. 9.

Class B.—Flying Officer C. C. Gissing, M.S.M. ; Dec. 5.

Class C.—Flying Officer C. W. A. Scott ; Dec. 9. Flying Officer A. W. Daly is transfd. to Reserve ; Dec. 9. The following Flying Officers resign their short service commns ; Dec. 8 : R. E. H. Horn, G. H. Jennings-Bramly. Pilot Officer J. L. Chadwick relinquishes his short service commn. on account of ill-health ; Dec. 8.

Stores Branch

Wing Comdr. F. H. Kirby, V.C., C.B.E., D.C.M., is placed on retd. list, and is granted permission to retain rank of Group Capt. ; Dec. 8.

Accountant Branch

The following are granted permanent commns. as Pilot Officers on probation with effect from and with seny. of Dec. 4 :—W. S. Calder, R. S. Sweet, H. D. Connor, H. C. Bakes, J. E. Gregson, B. Chadwell, D. A. K. Yiend, J. H. Glenn, C. M. Johnson.

Medical Branch

The following are granted short service commns. as Flying Officers for three years on the active list, with effect from and with seny. of Nov. 22 :—R. A. W. Kerr, M.B., E. Thompson. G. E. Church, M.B., is granted a short serv. commn. as a Flying Officer, for three years on the active list, with effect from and seny. of Sept. 1, and is seconded for duty with the Royal Albert Edward Infirmary and Dispensary, Wigan, from that date. Flying Officer B. W. Cross is promoted to the rank of Flight-Lieut. ; Dec. 4.

Memorandum

The permission granted to Sec. Lieut. (Hon. Lieut.) B. H. Hardy to retain rank is withdrawn on his enlistment in the T.A. ; Nov. 8.

Reserve of Air Force Officers

The following are granted commns. in General Duties Branch as Flying Officers on probation ; Dec. 7 :—

Class A.—E. B. W. Bartlett, R. H. Lemon, H. Shaw.

Class B.—A. J. G. Anderson, W. G. Gunning.

Pilot Officer on probation R. D. Hambrook is confirmed in rank ; Nov. 24. Flying Officer M. J. Wyatt is transfd. from Class C to Class B ; Dec. 5. Flight-Lieut. A. H. S. Baker, O.B.E., relinquishes his commn. on completion of service and is permitted to retain rank of Sqdn.-Leader ; Dec. 5. Flight-Lieut. W. P. Woodcock relinquishes his commn. on completion of service ; Oct. 24 (substituted for *Gazette*, Nov. 23). The following Flying Officers relinquish their commns. on completion of service : Dec. 5 : G. S. Coggan, W. J. Hannon, L. W. Kitt, S. F. A. Welsh, G. W. Wilson, A.F.C. Flying Officer H. J. Armitage relinqu8shes his commn. on account of ill-health, and is permitted to retain his rank ; Dec. 8. Flying Officer C. R. H. Trevor resigns his commn. ; Dec. 7.

Princess Mary's R.A.F. Nursing Service

Matron Miss M. W. Campbell is placed on the retired list ; Dec. 6. Miss P. K. Pearce resigns her appointment as sister ; Sept. 11.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Wing Commander A. W. Tedder, to Air Ministry, Directorate of Training for Air Staff (Training) duties ; 1.1.27.

Squadron Leaders: A. R. Arnold, D.S.C., D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 24.11.26. J. C. M. Lowe, to Air Ministry, Department of the Air Member for Supply and Research ; 7.12.26. C. N. Lowe, M.C., D.F.C., to No. 6 Sqdn., Iraq ; 24.11.26.

Flight Lieutenants : D. S. Earp, D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 24.11.26. L. Darvall, M.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 25.10.26. J. D. Breakey, D.F.C., to Home Aircraft Depot, Henlow ; 2.12.26. G. M. Lawson, M.C., to H.Q., Egypt ; 20.11.26. J. R. Cassidy, to No. 2 Armoured Car Co. and Repair Section, Palestine ; 25.11.26. E. J. D. Townsend, to H.Q., Iraq ; 18.11.26.

Flying Officers : E. R. H. Coombes, to No. 15 Sqdn., Martlesham Heath ; 15.12.26. H. Walker, to No. 24 Sqdn., Kenley ; 15.12.26. I. Hodgson, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt. ; 28.11.26. J. B. V. Glyde, to R.A:F. Depot, Uxbridge, on transfer to Home Estabt. ; 25.10.26. B. J. J. Nimmo, to H.Q., Transjordan and Palestine ; 1.11.26. A. L. MacMillan, to Station H.Q., Kenley ; 1.12.26. J. St. C. Arbuthnott, to R.A.F. Training Base, Leuchars ; 24.11.26. J. G. Franks, to R.A.F. Training Base, Leuchars ; 3.12.26. G. J. Ross, to R.A.F. Depot, Egypt ; 13.11.26. C. V. Lock, to No. 55 Sqdn., Iraq ; 1.11.26. J. W. New, to No. 45 Sqdn., Iraq ; 8.11.26.

Pilot Officer E. H. Collinson, M.C. to No. 14 Sqdn., Palestine ; 26.11.26.

IN PARLIAMENT

Air Service in China

REAR-ADMIRAL SUETER, on December 8, asked the First Lord of the Admiralty whether he can state the number of British aircraft carriers and number of naval aeroplanes and seaplanes stationed in Chinese waters ?

Mr. Bridgeman : There are one aircraft carrier and one cruiser carrying seaplanes in Chinese waters. There is also one cruiser carrying one seaplane *en route* to China.

Rear-Admiral Sueter asked, in the event of a British aircraft carrier serving on the China station becoming damaged through collision in a fog or striking sunken wreckage, necessitating shifting a propeller, or the necessity arising of examining and repairing underwater fittings, where would the ship be dry-docked ; and what distance is this dock from the naval base in those waters ?

Mr. Bridgeman : The China Squadron is based on Hong Kong, where there are ample facilities for docking His Majesty's ships. The second part of the question does not, therefore, arise.

Rear-Admiral Sueter asked whether, in view of the menace to British nationals and British property in China waters, the air resources at the disposal of the British naval commander-in-chief on the China station are considered adequate ?

Mr. Bridgeman : The answer is in the affirmative.

Airship Guarantee Company

MR. VIANT asked the Secretary of State for Air if the £60,000 appearing in the 1925 Air Estimates, or any part of that sum, has been paid to the Airship Guarantee Company ; and, if so, on what date ?

Sir Philip Sassoon : No, Sir. The sum of £60,000, which was taken in the Air Estimates, 1925, was not earned and lapsed, as an unspent provision. A sum of £30,000 has been taken in the current year's Estimates, and is expected to be earned and paid.

Aircraft Disposals Co. Ltd.

MR. VIANT asked the Secretary of State for Air the sum or sums of money paid by the Aircraft Disposals Co., Ltd., in respect of the surplus aeroplanes, engines, spares, etc., and warlike stores acquired from the Air Ministry ?

The Financial Secretary to the Treasury (Mr. Ronald McNeill) : I have been asked to reply. The moneys received up to the present by the Disposal Board in respect of the sale in question amount to £1,014,891. A further sum of £55,597 13s. 2d. is due from the company and is payable, subject to interest, by five quarterly instalments, the next instalment being due on December 25.

R.A.F. Operations in Iraq

MR. VIANT asked the Secretary of State for Air the number of machines that have been written off charge as a result of enemy action during the period of January 1 to November 18, 1926: who were the enemies ; and what were the circumstances, and the nature of the service upon which the aeroplanes were at the time employed ?

Sir S. Hoare : The answer to the first part of the question is one aeroplane. As regards the remaining parts of the question, the aeroplane was carrying out a reconnaissance in the Sulamanie district of Iraq on the 14th June to locate followers of the rebel Kurdish chieftain, Sheikh Mahmud. The aeroplane had a forced landing, and was seized, looted and destroyed. The occupants were held in captivity for some months by Sheikh Mahmud, but were eventually released.

R.33 Experimental Flights

MR. WELLS asked the Secretary of State for Air if he proposes to make use of the airship R.33 for further experimental flights during next year.

Sir S. Hoare : No decision has yet been reached in regard to any experimental flights of R.33 next year. I may say, however, that no further flights are contemplated in connection with the present programme.

R.A.F. Accidents

MR. HORE-BELISHA, on December 9, asked the Prime Minister whether he will allot a day before the House rises to discuss the position created by the continued sequence of accidents in the Air Force ?

The Prime Minister : I regret that I cannot give time for this discussion. Though I deeply deplore such accidents, I am satisfied that every possible precaution has been and will continue to be taken to safeguard the lives of the Royal Air Force personnel.

Capt. Garro-Jones asked the Secretary of State for Air what is the routine system of investigation into aeroplane accidents in the Royal Air Force ; how long it has been in force ; and whether he will consider any strengthening of the system of investigation from headquarters ?

Sir Philip Sassoon : As regards the first part of the question, the routine procedure in connection with the investigation of flying accidents is laid down in detail in paragraphs 1312 and 1313, King's Regulations and Air Council Instructions, 1924, from which it will be seen that a Service Court of Inquiry is held on all serious accidents. The reports of all Courts of Inquiry are, of course, scrutinised in detail at the Air Ministry with the utmost care. An entirely independent investigation is also made into every serious accident by the Inspector of Accidents of the Air Ministry, who renders his reports direct to the Secretary of State. In the light of his report and that of the Service Court of Inquiry all possible steps are taken to prevent a recurrence. In addition, the details of all flying accidents and forced landings are summarised every six months and investigated statistically with a view to elucidating recurring causes of accidents and other statistical inquiries on special aspects of the problem, such as engine failures, are constantly undertaken. For further information in regard to the measures taken to prevent accidents I would refer to the replies given on November 22 and 25 to Col. Gretton and Mr. Robinson, respectively. As regards the second part of the question, the present system has been in force, subject to minor changes, since the inception of the Royal Air Force. As regards the last part, I am not clear how the present system of investigation could be strengthened, but the question of the prevention of accidents is one which engages constantly the attention of the Secretary of State and of the Air Council, and if it is found that anything more can be done than is being done at present, whether by way of strengthening the investigation or otherwise to prevent crashes, the hon. and gallant member may be assured that it will be done.

Capt. Garro-Jones : Could not the hon. baronet strengthen the system under which only one officer makes a supplementary inquiry for the Air Ministry, especially in view of the fact that in many cases that officer has not been able to assign any cause for the accident ?

Sir P. Sassoon : I am satisfied that all precautions are being taken to make the investigation of accidents as strong as possible, but my right hon. friend will be glad to receive any suggestions which the hon. and gallant member may have in mind.

Capt. Garro-Jones : I did not say anything about precautions, but I asked whether it was possible for the system under which only one officer makes an investigation to be strengthened. Could not two or three officers join in these investigations in order to have the benefit of more than one head ?

Sir P. Sassoon : There are two separate inquiries composed of a sufficient umber of people to do the work efficiently.

Eastward Ho! by "Moths": Having once got clear of the bad weather hold-ups in England and France, Capt. Stack and Mr. Leete, of the Lancashire Aero Club, are now making good progress towards India in their D.H. "Moths." Our picture shows them (Capt. Stack on the left and Mr. Leete on the right, in front of the machine) superintending the refuelling with "Shell" spirit at Malta.

A Successful Italian Magneto

One of the "little" things that matter in the winning of such contests as the Schneider Cup race is the ignition employed on the engine of the machine concerned. Responsibility falls heavily, in fact, upon poor Mr. Magneto, for in all probability the reputation of the finest of aeroplanes and engines may seriously be impaired by his failing to carry out his duties to the best advantage. In this year's Schneider contest, which was won by Maj. Bernardi on the Macchi M. 39 mono-seaplane at an average speed of 246·496 m.p.h., it may be of interest to note that the 800 h.p. Fiat A.-S.2 engine fitted in this machine, was equipped with two Marelli 12-cyl. double spark, aeroplane magnetos. This magneto, which is handled in this country by Marelli Magnetos (England), Ltd., of 17, Wells Street, Oxford Street, W.1, are giving very satisfactory results with the various aero engines to which they are fitted. The recent flight from New York to Buenos Aires by *Sen. Duggan* on a Savoia flying-boat piloted by Capt. E. Oliveiro, was made with the help of one of these magnetos (type MF. 12).

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Not a 5-in. Aircraft Gun

It will, perhaps, hardly be necessary for us to draw our readers' attention to the fact that, contrary to the statement made on p. 810*o* of last week's issue of Flight, Messrs. Vickers, Ltd., are not *yet* manufacturing "5-in." guns for aircraft. The Vickers Automatic gun referred to, which is made together with other aircraft guns at their Erith factory, is, of course, of "0·5-in." calibre—that elusive decimal-point having got overlooked in the rush of getting out our special number. No doubt, in the near future, aircraft *will* carry 6-in. guns or similar armament! We wish, also, to apologise to our readers and to Messrs. Vickers for our carelessness in placing the "Eagle" aerial camera, in the same article, *on its side*, instead of pointing downwards, as it should do like all well-behaved aerial cameras!

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* * * *

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The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

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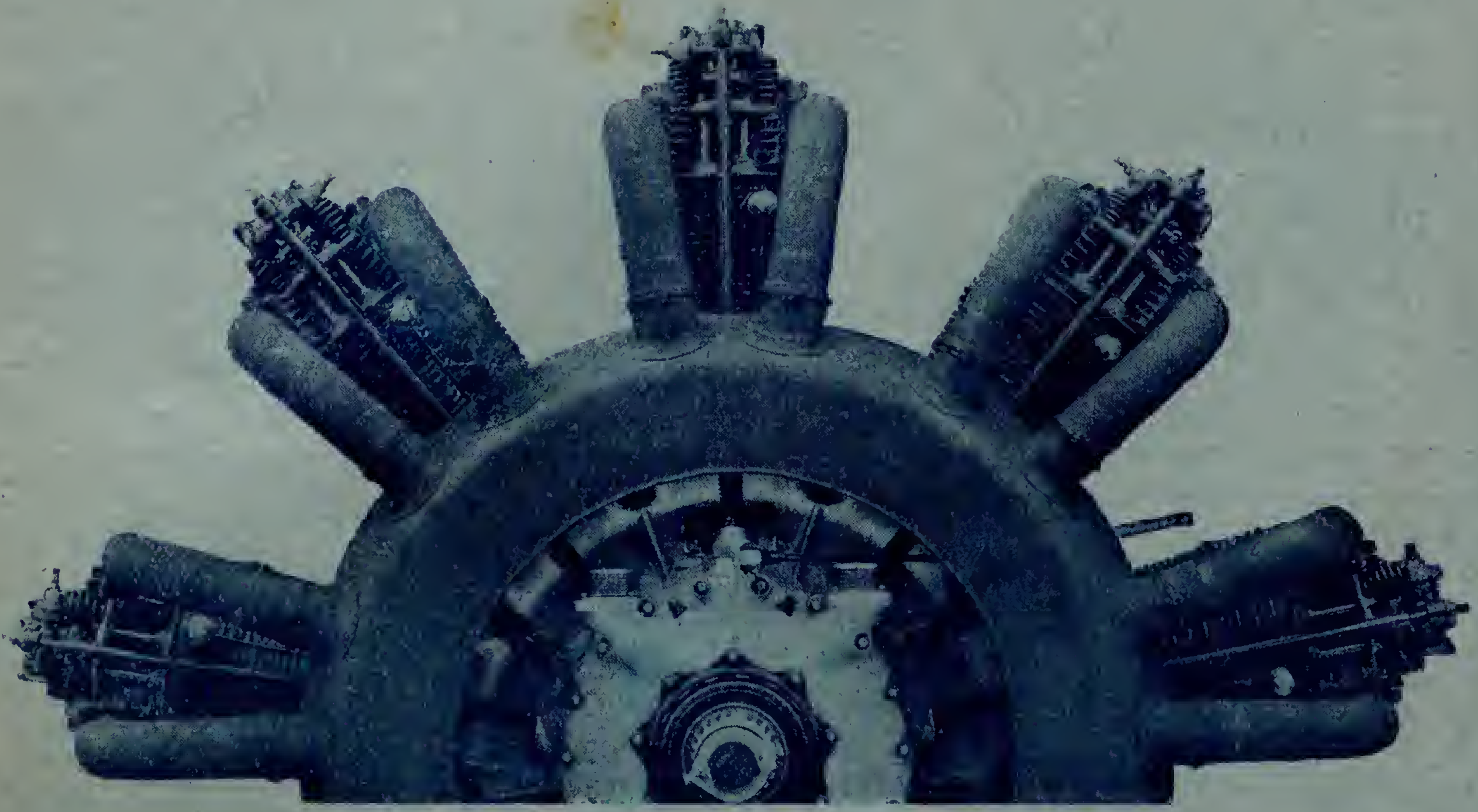

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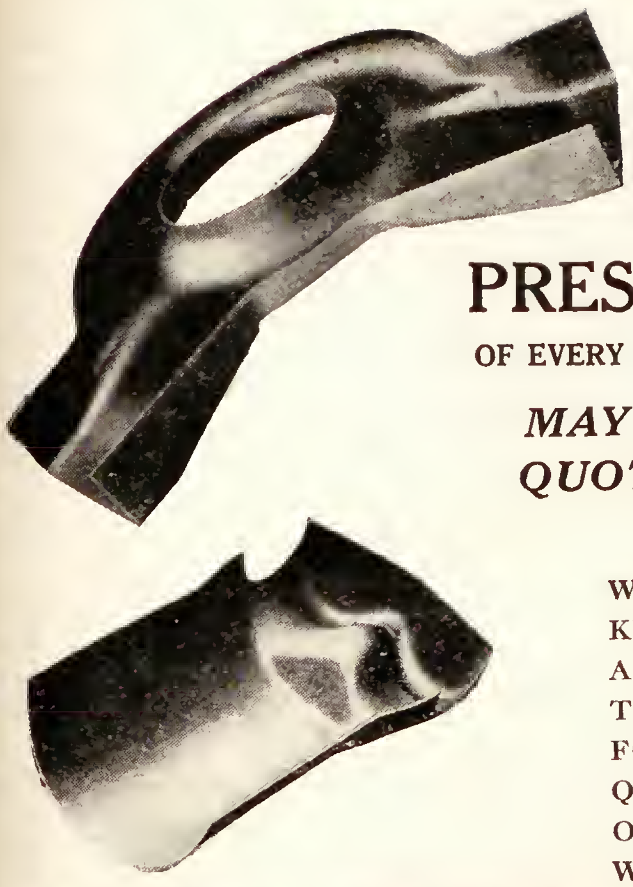

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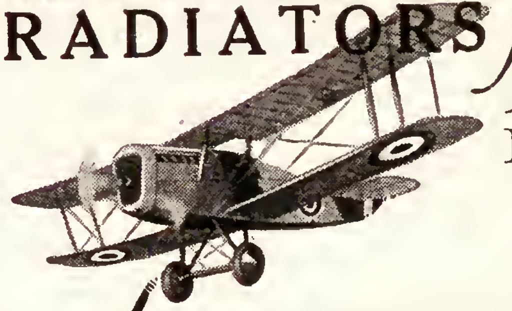

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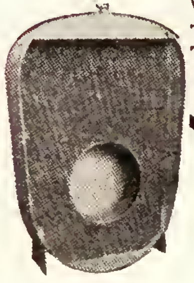

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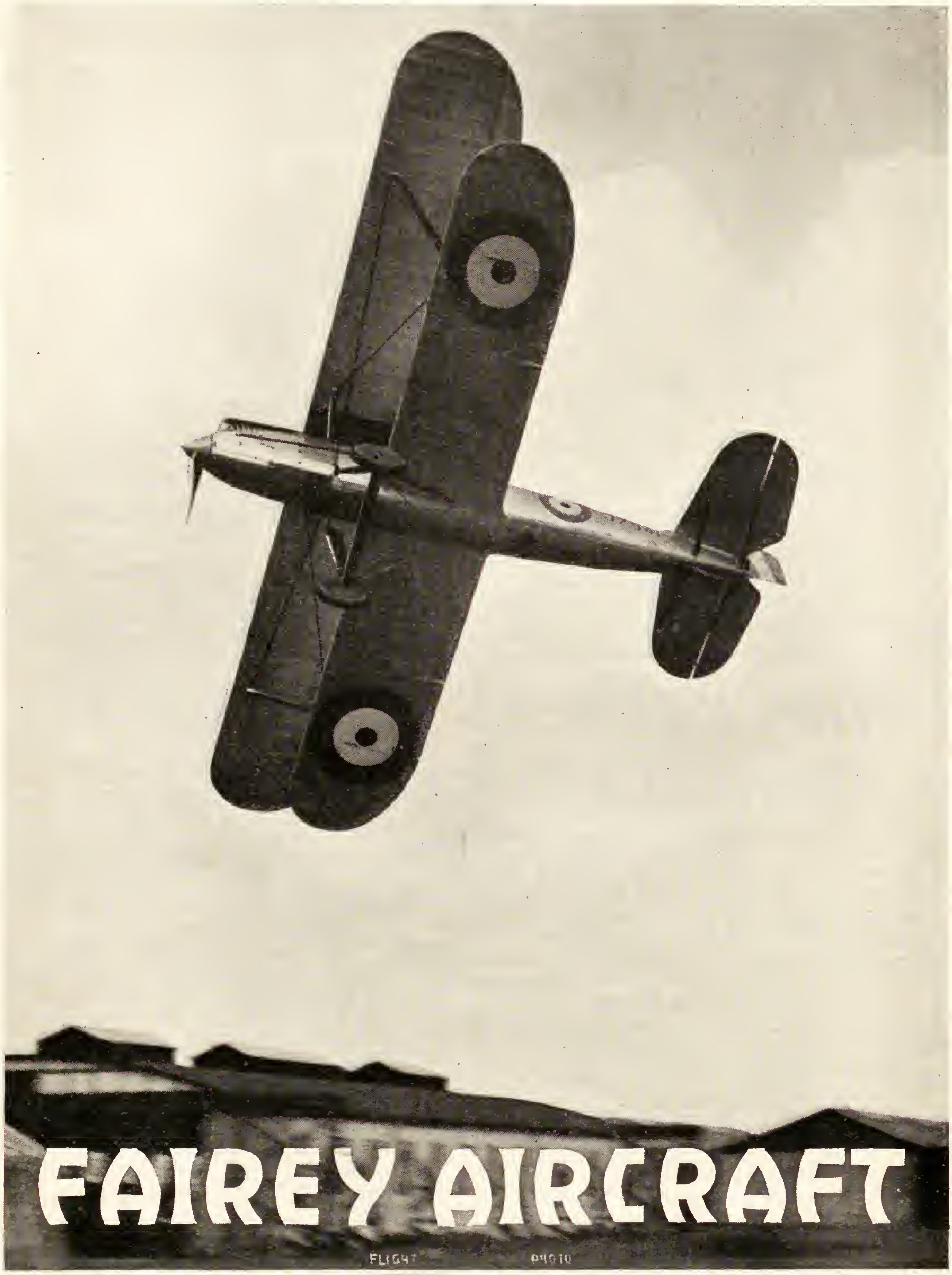

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1927

Jan. 13	**Professor F. C. Lea, D.Sc., M.Inst.C.E., M.I.Mech.E. "Some Experiments on the Effects of Repeated Stresses on Materials," before Inst.Ae.E.**
Jan. 25	**Mr. F. S. Barnwell, B.Sc., O.B.E., A.F.C., F.R.Ae.S. (Honours Member). "Some Notes on the Design of Airscrews," before Inst.Ae.E.**
Feb. 10	**Mr. H. P. Folland, F.R.Ae.S., M.B.E. (Honours Member). Paper, to be announced later, before Inst.Ae.E.**

EDITORIAL COMMENT.

Towards the Rising Sun

ALTHOUGH so far very bad weather conditions have rather interfered with its progress, the flight of the first of the De Havilland "Hercules" aeroplanes, with three Bristol "Jupiter" engines, may be regarded as marking an important milestone in the history of British aviation. All too long has Great Britain been content to sit down and operate a heavily subsidised air route between London and Paris—a route which is never likely to be of any particular use to anyone except as a sort of full-scale experimental establishment, but which we have had to keep alive because other nations operated subsidised air services over it. The real salvation of British civil, sometimes euphemistically called "commercial," aviation lies, without a doubt, in aviation planned and carried out on Imperial lines, and the departure, on Saturday last, December 18, of the first "Hercules" marks the beginning of real practical Imperial aviation. As our readers are already aware, the new three-engined de Havilland machines are intended for the Cairo-Karachi route, the portion of which from Cairo to Baghdad has been operated by the Royal Air Force for some considerable time, but which is to be handed over, early in the new year, to Imperial Airways, Ltd., a contract having been signed according to which this company is to be subsidised for running the service as a civil undertaking.

At first the service is intended to be a fortnightly one in each direction, and meteorological, wireless and refuelling stations have been established along the route at Cairo, Gaza, Rutbah, Baghdad, Basra, Bushire, Bundar Abbas, Chahbar and Karachi. It might be objected that machines with three engines of 425 h.p. each represents a good deal of power to use on a machine designed to carry comparatively few passengers, but it should be recollected that, not only will machines have very strong head winds to fight, calling for a high cruising speed, but also that the country, over portions of the route at any rate, is of such a nature that emergency landing grounds are not readily found, so that machines must be employed which are capable of continuing for many miles with only two engines running. Furthermore, the Arabian Plateau is situated at a considerable height above sea level, while the atmosphere is very hot, both of which factors reduce the lifting power of a machine, so that it will be seen that there are very excellent reasons for the adoption of machines with a good power reserve.

To begin with, the service will, as we have already said, be a fortnightly one, and at first it will only extend as far as Basra on the Persian Gulf. This is due to the fact that the entire fleet of machines is not yet ready. The remaining machines will, however, be delivered during February, March and April, and the service will then be extended to Karachi. According to the present time-table a machine will leave Cairo on Wednesday at 1 p.m., arriving at Karachi at 4.45 p.m. on the following Saturday. In the opposite direction machines will leave Karachi on Thursdays at 6 a.m., and arrive in Cairo at 10 a.m. on the following Sunday. Later on it is hoped that the volume of traffic will justify a weekly service, or possibly even twice a week.

The regular operation of the Cairo-Karachi section of the new Imperial air route to India and Australia will in itself enable a very considerable saving in time to be effected. Thus a traveller going to Karachi from London by sea takes 17 days to do the trip. By using the air route from Cairo to Karachi he completes the trip in 10 days, thus saving a whole week. The sea route to Baghdad and Basra occupies 23 and 22 days, respectively, while the air route will only take 8 days. As a beginning this is excellent, and doubtless, when the volume of traffic justifies it, night flying over, at any rate, portions of the route will be put into operation, when the saving in time will be very greatly increased. At the moment it seems doubtful whether air passengers would care to spend two or three days travelling continuously. The noise will probably be rather too trying for this to be an attractive proposition, except in cases of emergency, but there does not seem to be any technical reason why air mails should not be flown at night, since only by doing this can the full advantage of the speed of air transport be realised. Ultimately, of course, there will be an extension beyond Karachi, but at the moment it seems uncertain whether this will be by seaplane or by airship. We shall probably still have to wait a long time for airships to be capable of regular air-line work, and in the meantime it would be wise to run an experimental seaplane service from Karachi to Bombay, Calcutta, or even Rangoon.

As regards the departure of the first machine for the Imperial air route, this was piloted by Capt. Wolley-Dod, and carried as passengers Sir Sefton Brancker, Air Commodore Weir and Mrs. Weir, and Capt. Gladstone, who is going out to organise the new Khartoum–Kisumu air service, another Empire air undertaking which is likely to prove a useful link in the ultimate Cairo–Cape Town line, just as does the Cairo–Karachi section of the Cairo–Australia service of the future. The second machine left Croydon on December 20, piloted by Capt. Hinchliffe. On December 27 a third "Hercules" will depart from Croydon, carrying, among others, the Secretary of State for Air, Sir Samuel Hoare and Lady Maud Hoare, who are opening the new air lines officially and will travel as far as India in this machine. As they will have left before next week's issue of FLIGHT is distributed, we take this opportunity of wishing them *bon voyage*, and trust that their flight may prove instructive and interesting. In time to come we feel sure it will be regarded as historical. British aviation owes a great deal to Sir Samuel Hoare, who, like the Director of Civil Aviation, Sir Sefton Brancker, never loses an opportunity of demonstrating by personal example his belief in civil aviation. To Lady Maud Hoare also our thanks should be expressed for thus sharing with her distinguished husband the task not only of opening officially the new Empire air route, but of travelling several thousands of miles by air in order to be able to do so.

◆ ◆ ◆

Another Pioneer Venture

Christmas, 1926, seems destined to see the inauguration of a good deal of British Empire aviation in one way or another. We have already referred to the departure of the first de Havilland three-engined machines for the East, on board of the first of which is Capt. Gladstone, *en route* to organise the African air service from Khartoum to Kisumu. Before the year is out yet another air venture—one might even almost say adventure—will be well on its way. This is the surveying expedition to Northern Rhodesia which is being sent out by the Aircraft Operating Co. The members of this expedition, which will be under the leadership of Maj. Cochran Patrick, are leaving on December 31, taking with them several de Havilland 9's specially modified to suit the conditions to be met with in the work to be undertaken. These machines have been fitted with special undercarriages, and are powered by A.D.C. "Nimbus" engines. They will carry the new "Eagle" cameras which are operated by electric motors, and both vertical and oblique photographs will be taken. On a recent visit to the exhibition held by the Aircraft Operating Co. at the Air Ministry, Gwydyr House, we had an opportunity of discussing with Maj. Hemming and Major Cochran Patrick some of the details connected with this expedition, and photographs of the district over which the survey is being carried out promised a lot of hard work for those responsible. Emergency landing grounds have to be cleared and maintained, while the actual work of surveying and photographing from the air will be by no means easy on account of the nature of the country. However, every precaution is being taken, and the equipment used is the most up to date which it has been possible to obtain, so that the expedition starts well prepared for all emergencies. Again we wish all concerned the very best success, and shall follow with interest the progress of their work in the furtherance of British aviation.

To our Readers: Greetings and all Good Wishes for Christmas and the New Year.

The PARIS AERO SHOW 1926

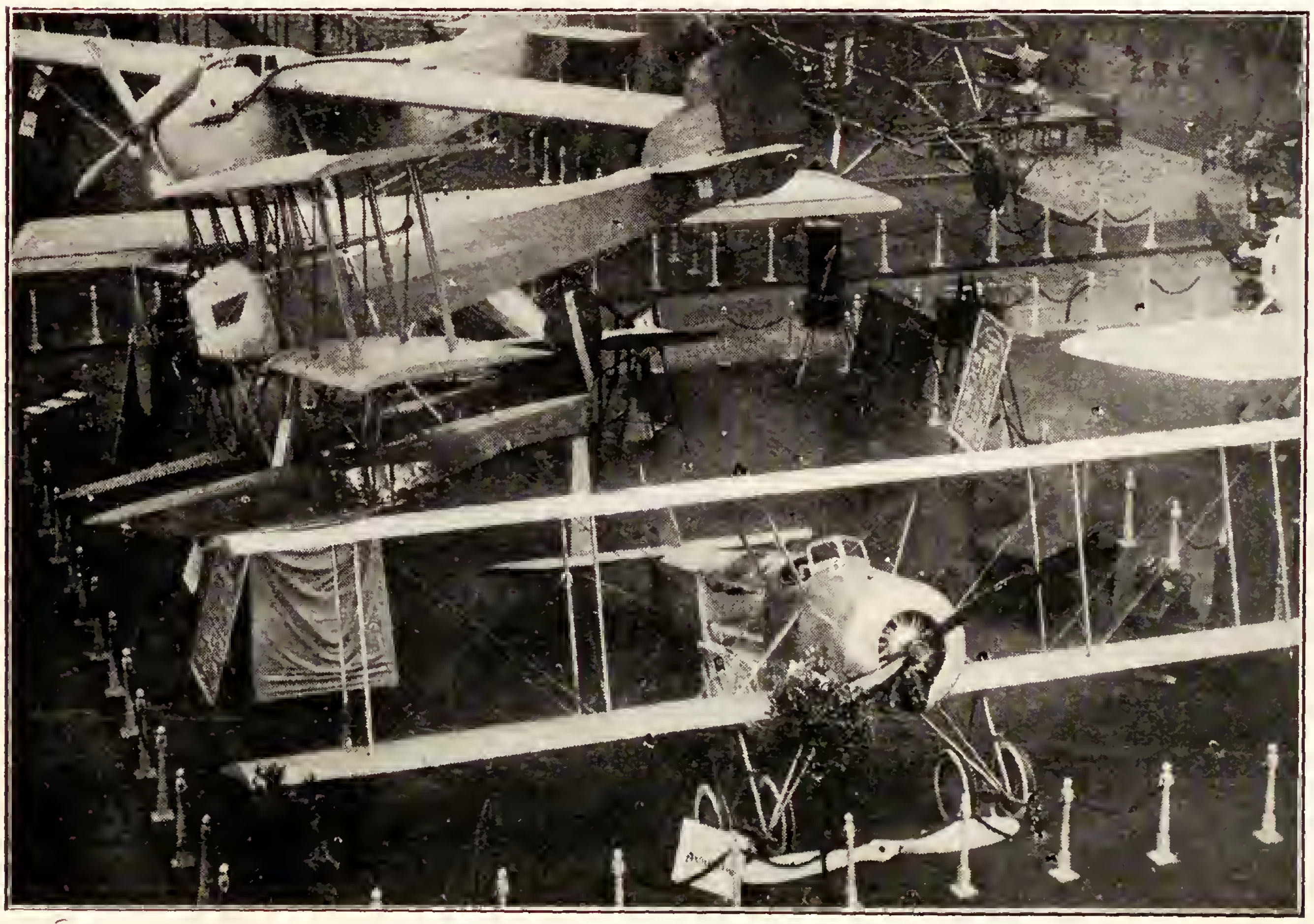
(*Concluded from p.* 835.)

HANRIOT

It may, perhaps, be said that the *Société des Avions Hanriot* holds in France a position somewhat analogous to that occupied in this country by A. V. Roe & Co. Like the Avro company, the Hanriot firm is among the pioneers of aviation, the late M. Rene Hanriot having been among the earliest workers, and his original monoplane nicknamed in the early Brooklands days the "Henrietta," still being affectionately remembered by quite a number of British pilots. A somewhat later type of monoplane, rather like the early Nieuports in its general lines but with a different undercarriage, was flown a good deal in this country just before the oubreak of war, by one Sabelli, and will also be remembered by many of our readers. One should not, however, push the analogy between Hanriots and Avros too far, since whereas the latter have produced very large and powerful machines which have been adopted in recent years, it is believed that Hanriots have lately concentrated almost entirely on school machines, some of which correspond very closely to our Avro 504's.

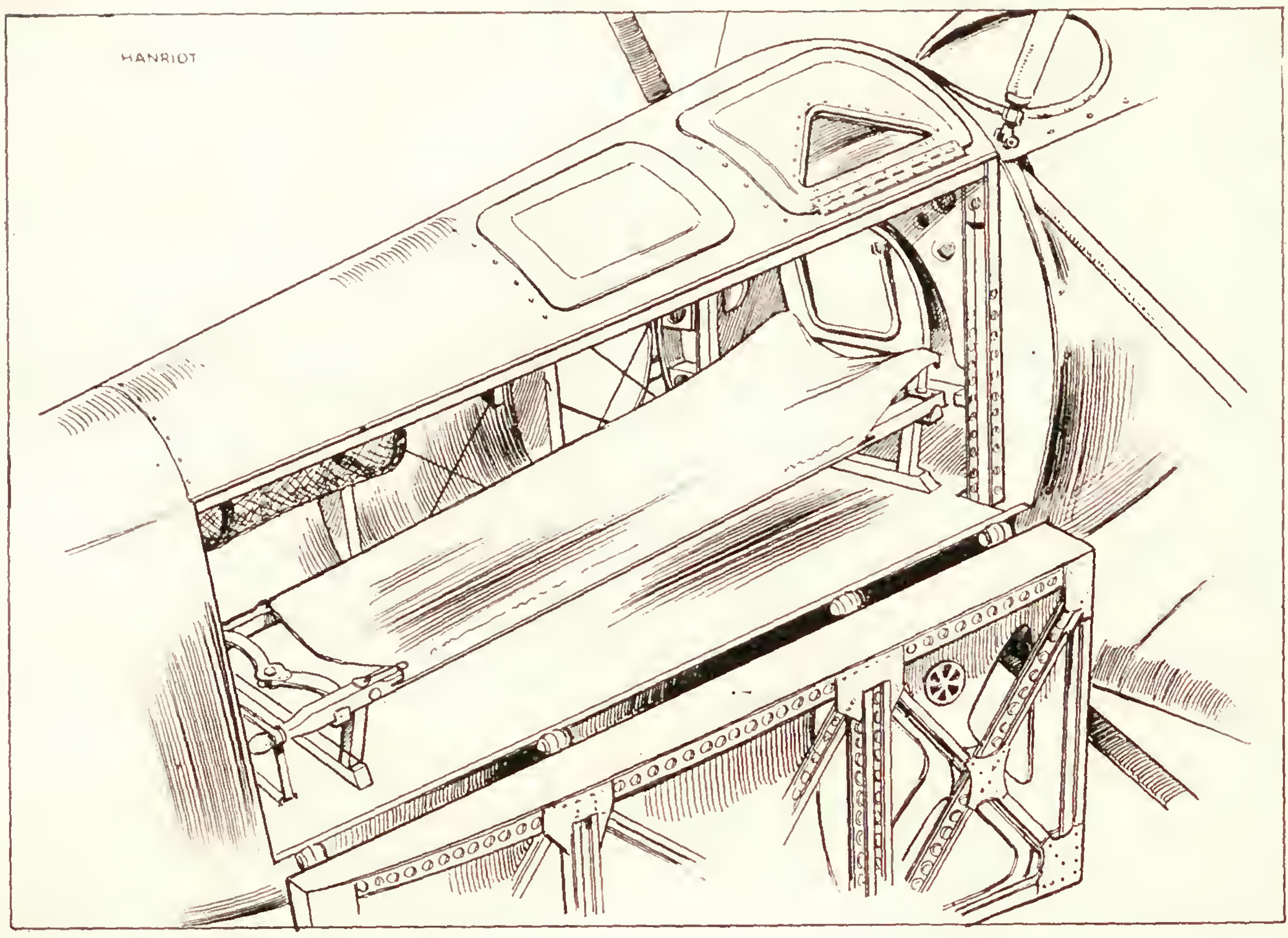
The death of M. Rene Hanriot has left the management of the firm in the hands of his son, Marcel Hanriot (who, in the early days of flying, had the distinction of being the world's youngest pilot), and, judging from the machines exhibited at Paris, M. Marcel is carrying on the family tradition of producing extremely useful school machines, as well as low-power *Avions Santaires*.

The fact that the three Hanriot machines exhibited at Paris were all either actual training types, or special applications of training types, explains why there was, in their design and construction, nothing novel which requires particular note. All three machines have done good work in their respective spheres, and have been supplied in considerable numbers to the French and to foreign air services. The type H 14 S ambulance plane has rendered excellent service in the Morocco campaign, and what the type lacks in load-carrying ability (it is fitted with a le Rhone rotary engine of 80 h.p. only) it makes up for by its great manœuvrability and very low landing speed. It seems likely that such a machine could take off and alight almost anywhere, advantages compared with which the carrying of but a single stretcher case is probably insignificant. Anyway the machine is, we believe, intended mainly for advanced working right up to the field of battle, and doubtless the wounded were, in many cases, transferred to faster and more powerful machines for transport to base hospitals. The type seems to have possibilities, certainly under conditions such as those that obtained in the Moroccan affair, and the low power ambulance machine might be useful in parts of the British Empire also.



The Hanriot Stand: In the foreground the H.14 S Ambulance machine with 80 h.p. le Rhone engine. Behind that the H.41 training seaplane with 120 h.p. Salmson, and in the background the H.35 advanced training machine with 180 h.p. Hispano.

["FLIGHT" *Photograph*



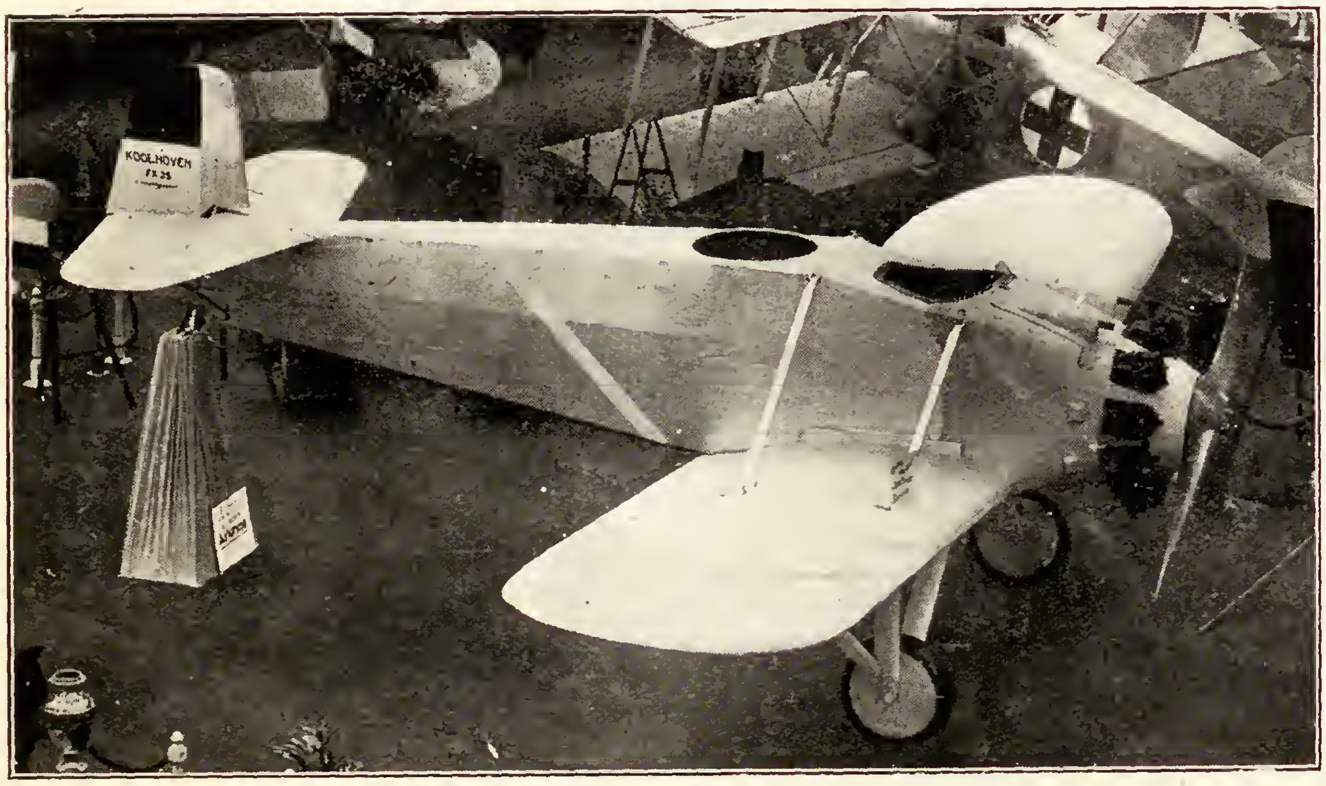
A low-power ambulance 'plane : The Hanriot H.14 S., which is fitted with 80 le Rhone engine, has accommodation for one stretcher case, the arrangement being shown in this sketch.

["FLIGHT" *Copyright Sketch*

KOOLHOVEN

AN unfortunate mishap prevented Mr. Frederick Koolhoven from exhibiting exactly the kind of machine he had intended to show, and as a result it may be that a certain small amount of adverse criticism may have been directed against the F.K. 35 as it actually appeared at the Paris Show. In order to form a truer picture, it should be pointed out that a fuselage had been built for the F.K.35 resplendent in high show finish and truly representative of the care usually bestowed upon detail by this well-known constructor. Four days before the machine was due to leave for Paris, the Show fuselage was being taken out of one shop for transport to another, when a lorry came along and skidded into it, with disastrous results to the fuselage. For a time it looked as if our old friend Koolhoven was going to be prevented from exhibiting after all, but with his usual determination he set to work and decided that, happen what might, the F.K. 35 should be shown. The skeleton of a second fuselage was almost completed, this being intended for loading tests. A council of war was held, and although most of his assistant designers, shop foremen, &c., were very doubtful whether the second fuselage could be got ready in time, Mr. Koolhoven said it *had* to be got ready, and by working on it two days and three nights the fuselage actually was completed and the machine was sent to Paris, where it arrived in time to be fully erected and ready for inspection at the opening of the Show. Under the circumstances, however, it will be realised that one should not expect quite a Show finish, nor was the machine exhibited fully equipped, as it would otherwise have been. For all that, the little two-seater fighter attracted a good deal of attention, and, we understand that there is every likelihood that the licence to build the machine abroad will shortly be arranged for.

A general description of the F.K.35 appeared in our issue of December 2, and it will therefore suffice if we recall that the machine is normally a low-wing monoplane with fuselage of tubular construction, and an all-wood wing covered with plywood. A somewhat unusual feature of the wing is that although it has a fairly pronounced dihedral it is built in one piece, the centre fitting into a recess in the bottom of the fuselage and being held in place by a few bolts. The machine is not a cantilever monoplane, since it is braced some distance out by tubes sloping to the top rails of the fuselage, this feature having doubtless been necessitated by the fact



The Koolhoven F.K.35 is a two-seater machine convertible from monoplane into biplane. The engine is a "Jupiter." The circular cockpit coaming is designed to take the new Koolhoven gun turret.

["FLIGHT" *Photograph*

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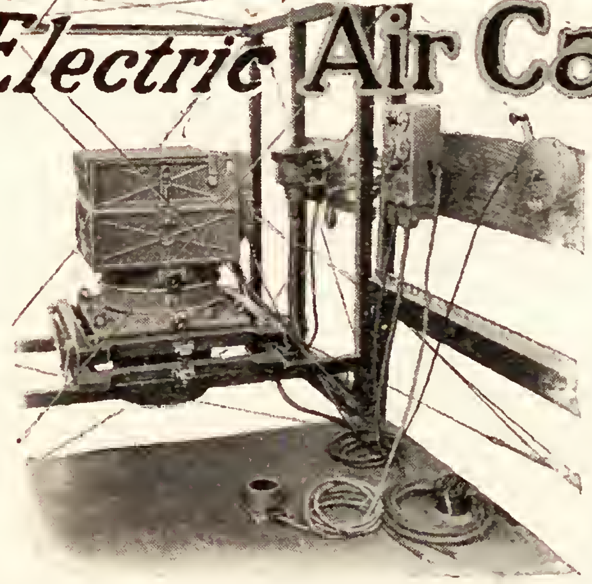

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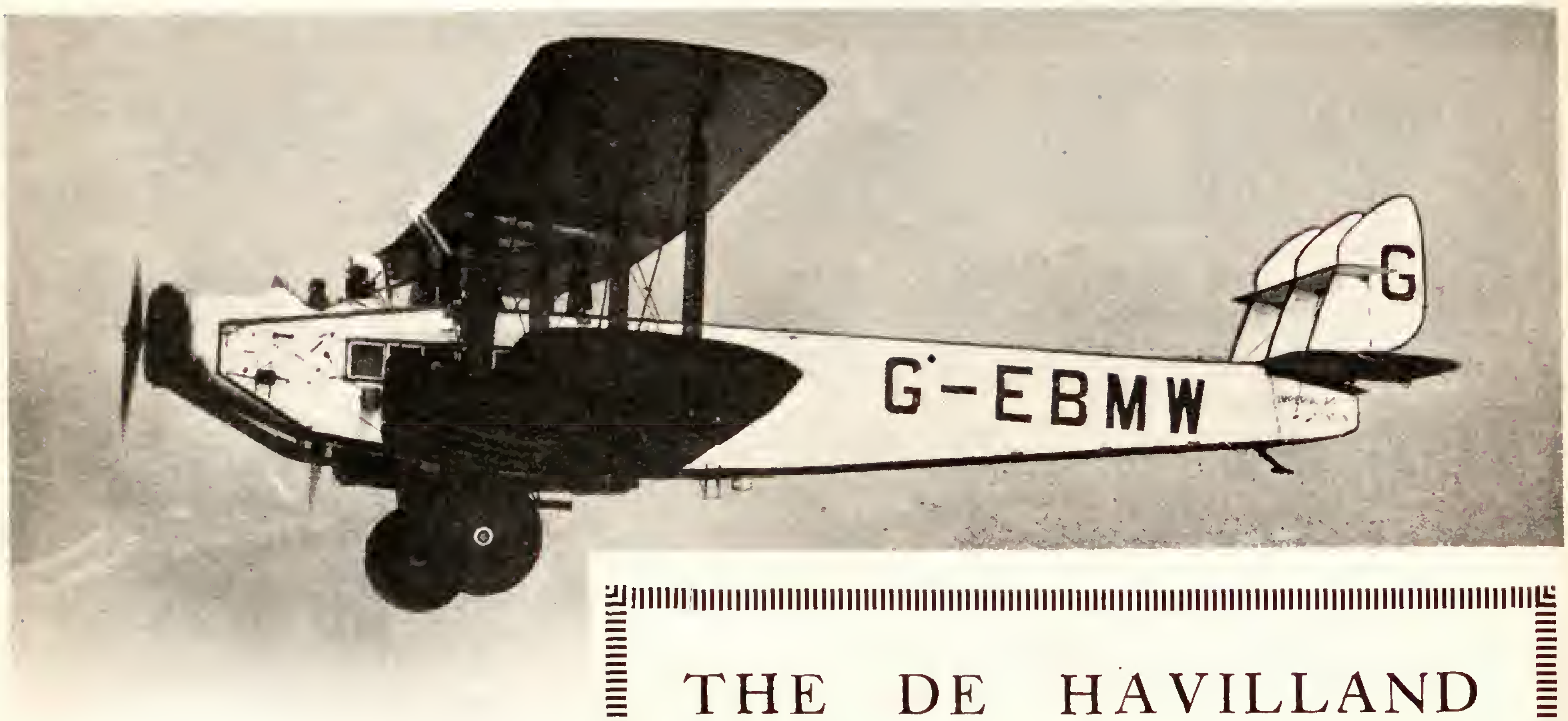

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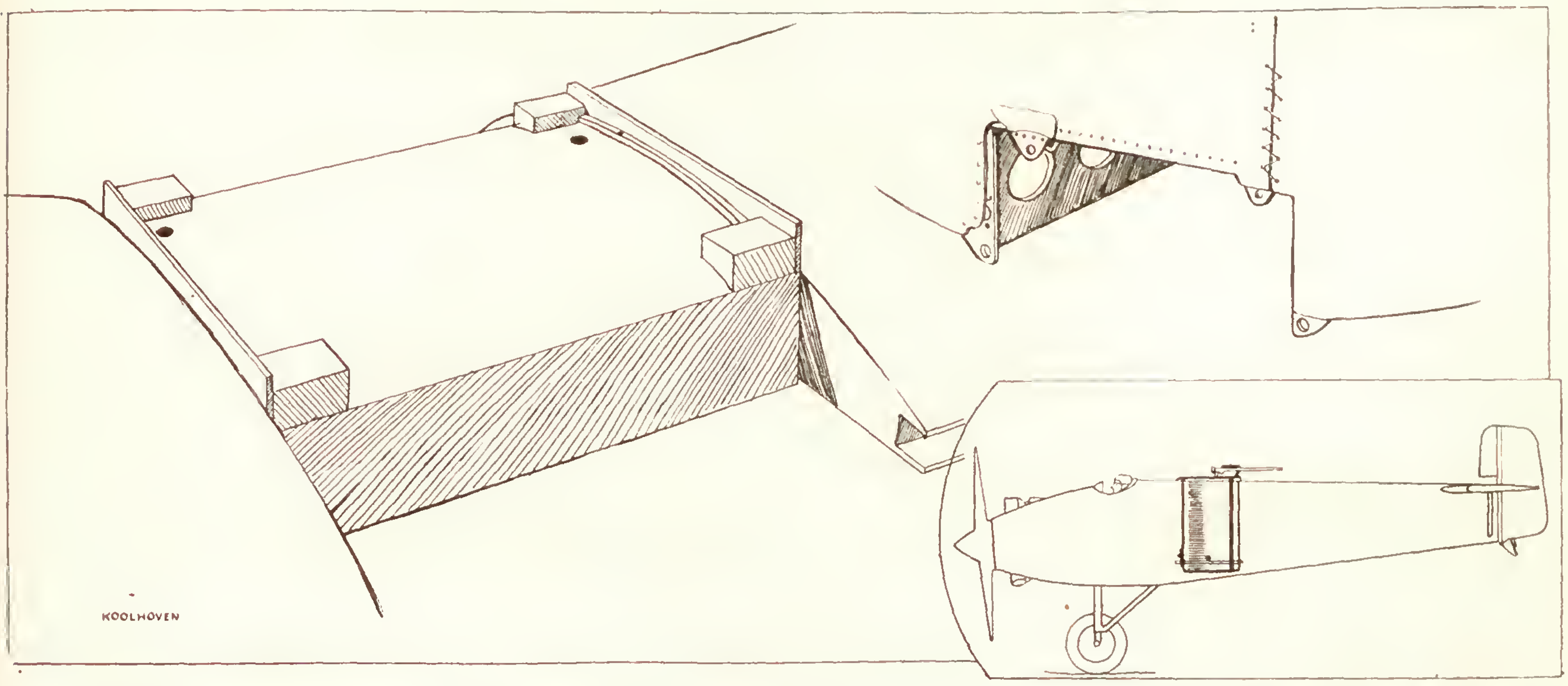


[" Flight " *Copyright Sketches*

Some Koolhoven details : On the left, a view of the centre portion of the monoplane wing, showing how it fits into the fuselage. The cut out in the latter for the accommodation of the wing is shown on the right. Below is a diagram of the mounting of the Koolhoven mechanically-operated gun turret.

that the undercarriage is attached to the wings in order to get a very wide wheel track. The undercarriage is of the oleo type, which has been used by Koolhoven since about 1915, with two Vees under the wings and bent wheel axles, the free ends of which engage with the Vees outside the wheels.

The Jupiter engine is neatly cowled in, and the more usual metal spinner has been supplanted by a swelling of the actual propeller boss.

The lines of the fuselage are such that a distinct break occurs in the top longerons immediately ahead of the gunner's cockpit, the longerons sloping down sharply from this point to the engine. By this arrangement the gunner is placed relatively high and could, if necessary, fire forward and upward over the head of the pilot, provided his guns were elevated sufficiently for the bullets to clear the propeller tips.

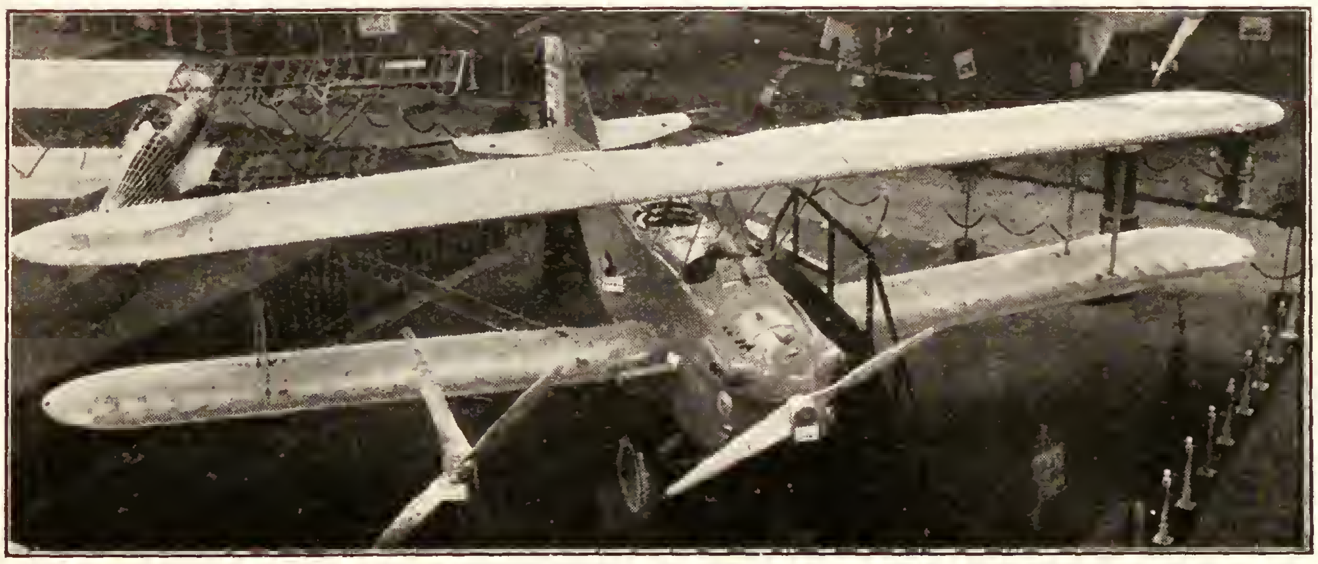
In connection with the gunner's cockpit it should be pointed out that as exhibited the machine was incomplete. The circular coaming was intended for a new gun turret which has recently been patented by Mr. Koolhoven. This gun turret is in the form of a cylinder, carrying the guns, gunner's seat, ammunition racks, etc. It is so mounted in the fuselage as to be free to rotate, and the patented feature consists in the mechanism used for operating the turning of the turret. The type of engine starter in which energy stored in a flywheel turned by hand is used for starting aero engines, is probably already familiar to our readers. The same principle has been applied by Mr. Koolhoven for turning his mechanically-operated gun turret. In this case, however, the flywheel is spun, not by hand but by means of a pedal operated by the gunner's feet. Clutch mechanisms are incorporated in such a manner that by the movement of a single lever the gunner can lock the turret in any given position or can turn it in any direction, practically irrespective of the forward speed of the machine. It is claimed that as an air fight generally lasts a few minutes only, and sufficient energy is stored in the flywheel to operate the gun turret for a much longer period, there should be no need for the gunner to speed up his flywheel during an actual fight, this being done during the intervals between fights. Details of the actual mechanism may not be given at the moment, but a diagrammatic representation of the arrangement is shown.

The Koolhoven F.K.35 weighs fully loaded 3,380 lbs., and as the wing area is 250 sq. ft., the wing loading is somewhat heavy, *i.e.*, 13·5 lbs./sq. ft. Consequently, it may be expected that the landing speed must be somewhat high. Thus, if a maximum lift coefficient of 0·7 is assumed, the landing speed would be in the neighbourhood of 62 m.p.h. The estimated speed of the machine at 10,000 ft. is 162 m.p.h. Presumably this performance refers to the machine as fitted with the high-compression Gnôme-Rhône Jupiter.

P. LEVASSEUR

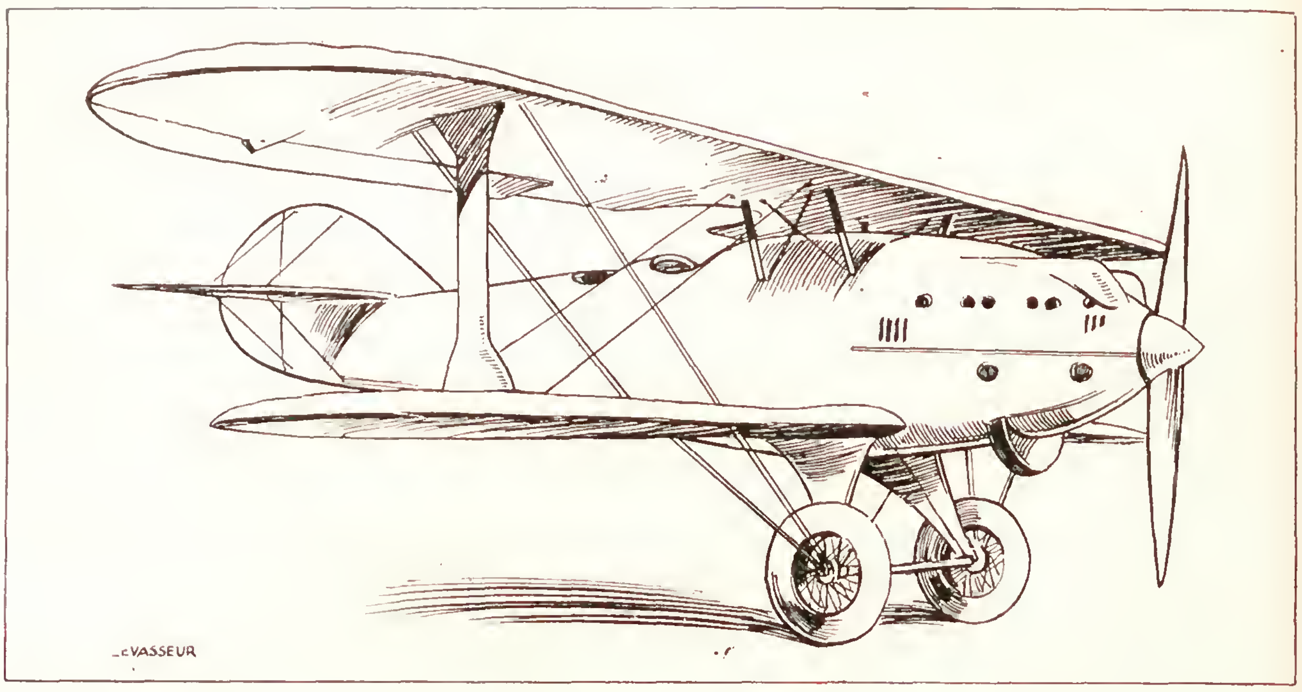
Of the three machines exhibited by P. Levasseur one was a three-seater naval reconnaissance machine, of the type originated by this firm in which the undercarriage can be dropped, the fuselage being watertight, and the machine being steadied when floating on the sea by two small wing-tip floats. For this operation the propeller is locked by a special mechanism in a horizontal position, so as to prevent any tendency for the machine to nose over. The machine exhibited was generally similar to machines of this type shown at previous Paris exhibitions.

On exceptionally clean lines was the P. Levasseur VI. C.2 two-seater fighter with Hispano engine. The general lines of this machine are illustrated by a sketch, while the undercarriage, which is chiefly remarkable on account of the absence of any springing other than that provided by the tyres, forms



The P. Levasseur three-seater naval reconnaissance aeroplane is fitted with "droppable" undercarriage, water-tight fuselage and wing tip floats.

[" Flight " *Photograph*



The Pierre Levasseur two-seater fighter has a rigid undercarriage, the only springing being provided by the tyres.

"Flight" *Copyright Sketch*

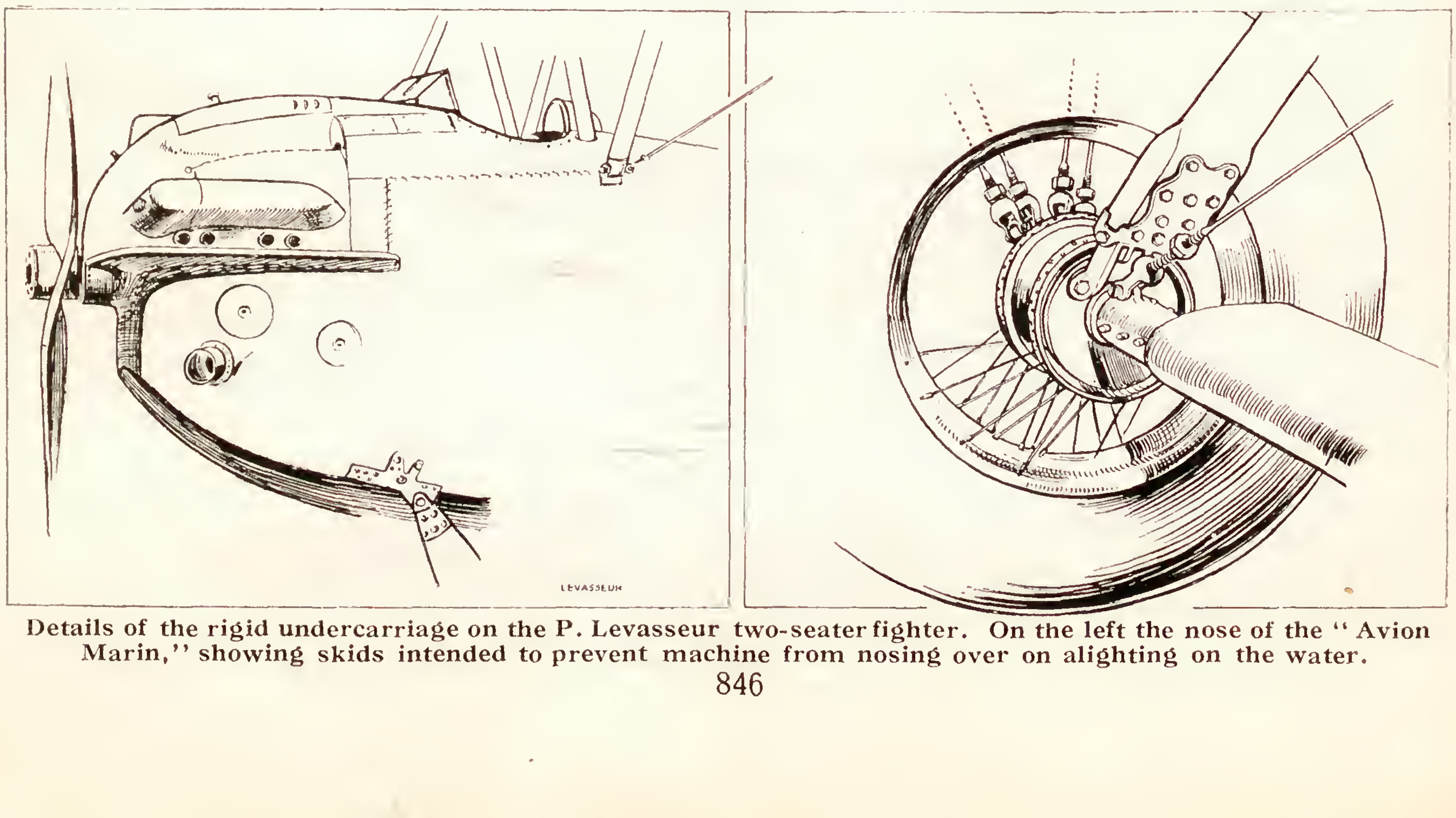
the subject of another sketch. Apart from its good lines the VI. C.2 is of straightforward design and construction. The fuselage is a semi-monocoque type, while the wings have metal spars and wood ribs.

In some ways perhaps the most interesting of the Levasseur machines was the limousine type VII.T, fitted with Jupiter engine. This machine had a very spacious and well-appointed cabin with seating accommodation for six passengers. The fuselage construction of the VII.T is of the type originated by this firm some years ago, in which the main structure consists of two fore and aft members forming Warren girders. These members are of multi-ply construction, the joints between longerons and struts being formed by overlapping the laminations rather in the manner familiar from the construction of laminated wood air screws. It is claimed that this construction is very economical as regards strength for weight, and that it is very cheap to make and keeps its shape remarkably well in service. In the case of the VII.T cabin machine, this form of construction has the further advantage of making possible an entirely unrestricted cabin space. The actual machine exhibited had its cabin portion finished in the form of a Weymann body, which looked remarkably well. How it will withstand the wear and tear of commercial flying in all weathers remains to be seen. A notable feature of the VII.T was that its tail surfaces were of ample proportions, and certainly very much larger than those found on the majority of French machines. Perhaps this may be explained by the fact that M. Charles Frechet, the firm's Managing Director, spent a goodly portion of the war years in the British Air Board, and that he has ever since been keeping in very close touch with British aviation progress. It is notable that British machines have, generally speaking, considerably larger control surfaces than those of foreign nations, and in consequence are much more manœuvrable at angles near, or even above, the stalling speed. The Levasseur VII.T should certainly share with British machines this manœuvrability and altogether looks a very promising commercial aeroplane. With a fuel load of 660 lbs. this machine has a pay load of 1,870 lbs., which appears to be a very useful commercial proposition.

LIORE ET OLIVIER

Although the main character of the French Aero Show of 1926 was distinctly military, a few commercial aircraft were exhibited, and the firm of Liore et Olivier can claim the distinction of showing two commercial types and no military types at all. The LeO H.190 is a single-engined tractor flying-boat, with Gnôme-Rhône engine. This machine is similar to that which recently successfully accomplished the flight from Marseilles to Madagascar, following the coasts and rivers of Africa. The type generally resembles previous machines built by this firm, and it was noticed that although the hull is not of the circular section type to which we are accustomed in this country, its flat tumble-home sides, surmounted a planing bottom shaped more like those found on British flying-boats. Instead of the straight Vee bottom to which hitherto the majority of French flying-boat constructors have confined themselves, the LeO H.190 has these surfaces curved into reverse curvatures. This machine has a useful load (*i.e*, paying load) of 2,245 lbs., which seems very good for a flying-boat. In the machine exhibited, part of this paying load was intended to be in the form of six passengers, the remaining weight being made up of luggage and mails or goods.

The second machine exhibited on this stand was the LeO 21 commercial aeroplane, which is fitted with two Jupiter engines. This machine is somewhat reminiscent of the Farman Goliaths, what with its square wing tips and its forward cabin projecting a long distance ahead of the wings. We understand that several of these machines will shortly be placed on the London-Paris service of the Air Union. It might here be mentioned that this machine is



Details of the rigid undercarriage on the P. Levasseur two-seater fighter. On the left the nose of the "Avion Marin," showing skids intended to prevent machine from nosing over on alighting on the water.

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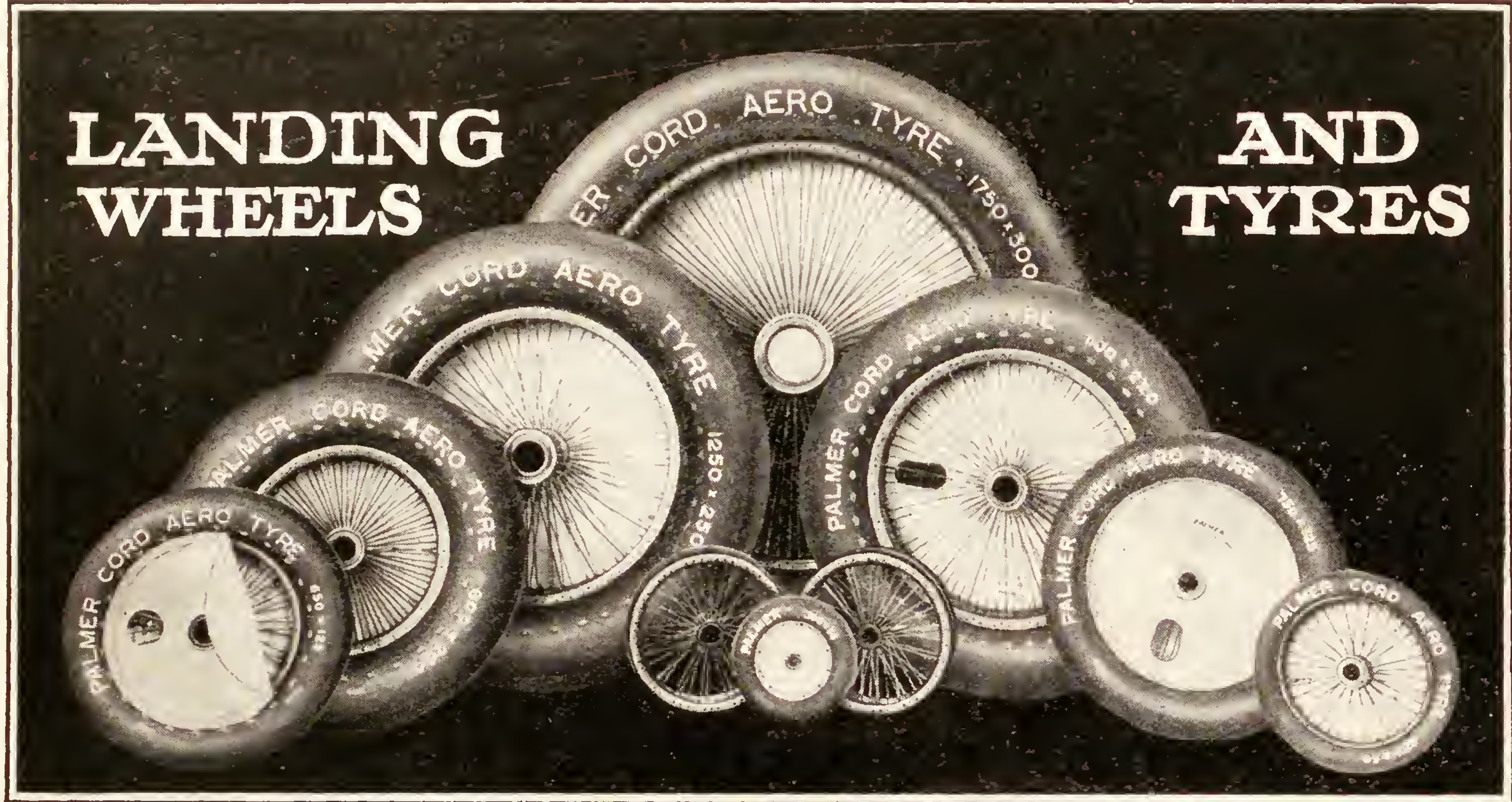

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300 × 60	16	111.12	25.4	Central
450 × 60	30	89.	31.75	Central
"	172	130.	38.09	Central
575 × 60	21	160.	28.	Central
"	180	150.	38.09	104/46
"	186	120.	34.92	Central
"	190	150.	38.09	Central
650 × 65	78	178.	44.45	132/46
"	79	178.	44.45	Central
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46
600 × 75	21	160.	28.	Central
"	180	150.	38.09	104/46
"	186	120.	34.92	Central
"	190	150.	38.09	Central
700 × 75	78	178.	44.45	132/46
"	79	178.	44.45	Central
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46
700 × 100	77	178.	44.45	132/46
"	92	185.	55.	135/50
"	95	185.	55.	Central
"	99	178.	38.89	132/46
700 × 100	112	150.	38.09	Central
"	176	178.	44.45	Central
"	179	178.	55.	132/46
650 × 125	119	178.	55.	132/46
"	147	178.	55.	Central
"	188	120.	34.92	Central
750 × 125	77	178.	44.45	132/46
"	92	185.	55.	135/50
"	95	185.	55.	Central
"	99	178.	38.89	132/46
"	112	150.	38.09	Central
"	176	178.	44.45	Central
"	179	178.	55.	132/46
800 × 150	161*	185.	55.	135/50
"	162*	185.	55.	Central
"	163*	185.	66.67	135/50
"	169†	185.	55.	135/50
"	177	185.	55.	135/50
"	183	185.	55.	Central
"	211*	185.	60.32	135/50
1000 × 150	167	185.	55.	125/60
"	174	250.	80.	Central
"	182	185.	55.	Central
1000 × 150	187	220.	66.67	Central
"	201	185.	60.32	125/60
"	210	185.	60.32	Central
1000 × 180	148	220.	80.	Central
"	149	185.	55.	Central
"	155	220.	66.67	Central
"	166	185.	55.	125/60
900 × 200	107	185.	55.	Central
"	108	185.	55.	125/60
"	128	220.	66.67	Central
"	137	250.	80.	Central
"	157	185.	80.	Central
"	202	185.	60.32	Central
1100 × 220	134	220.	66.67	Central
"	136	250.	80.	Central
975 × 225	192	185.	60.32	Central
"	194	185.	55.	125/60
1250 × 250	133	250.	80.	Central
"	154	304.8	101.6	Central
1500 × 300	115	304.8	101.6	Central
"	126	304.8	152.4	Central
1750 × 300	139	400.	152.4	Central
"	191	350.	150.3	Central
1750 × 350	193	400.	125.	Central

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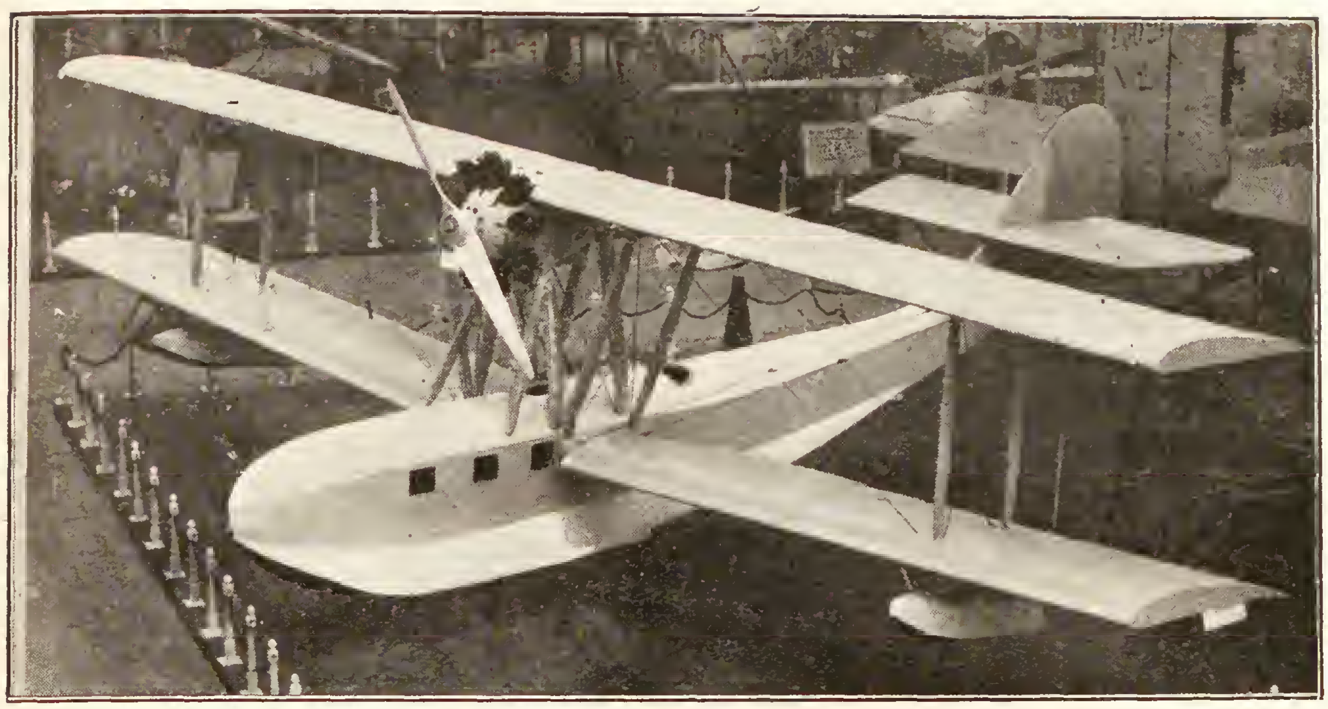
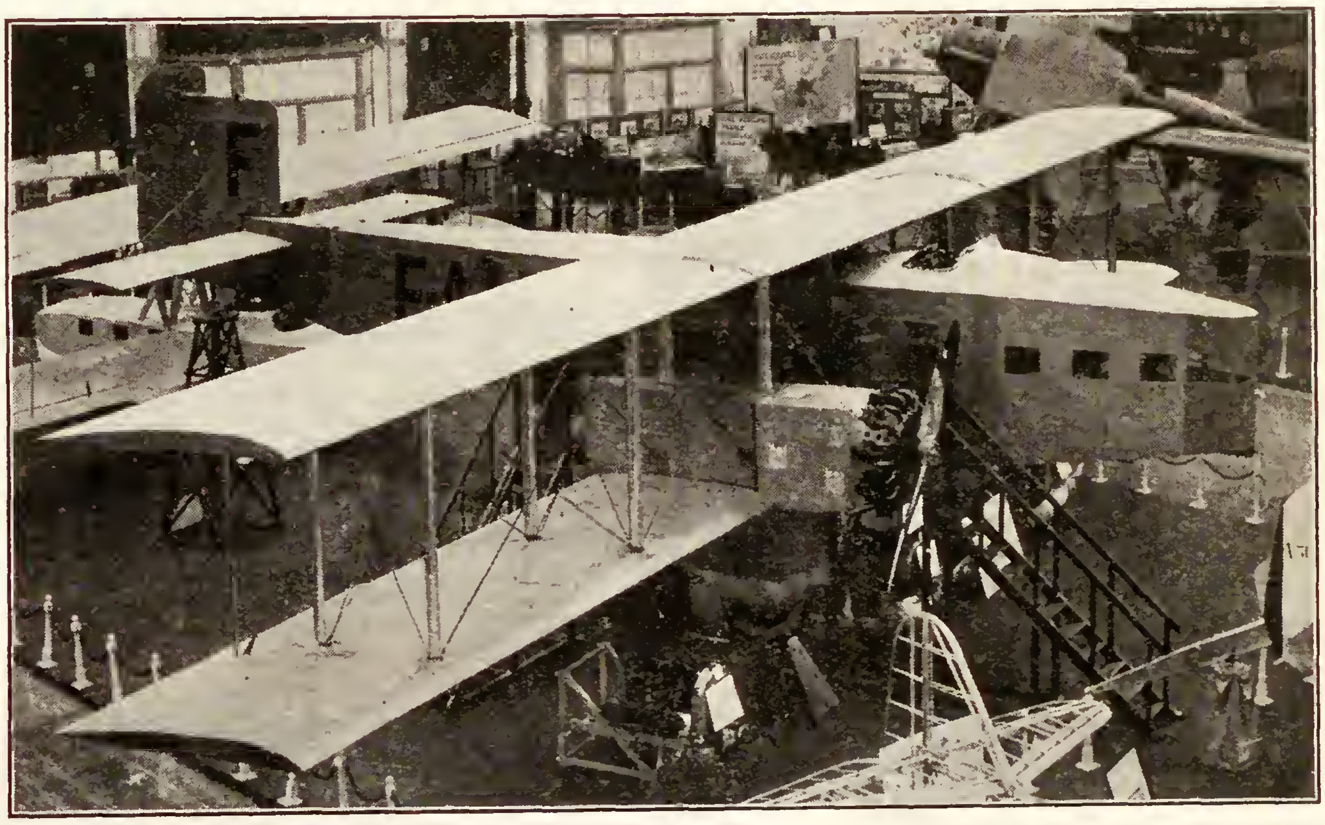


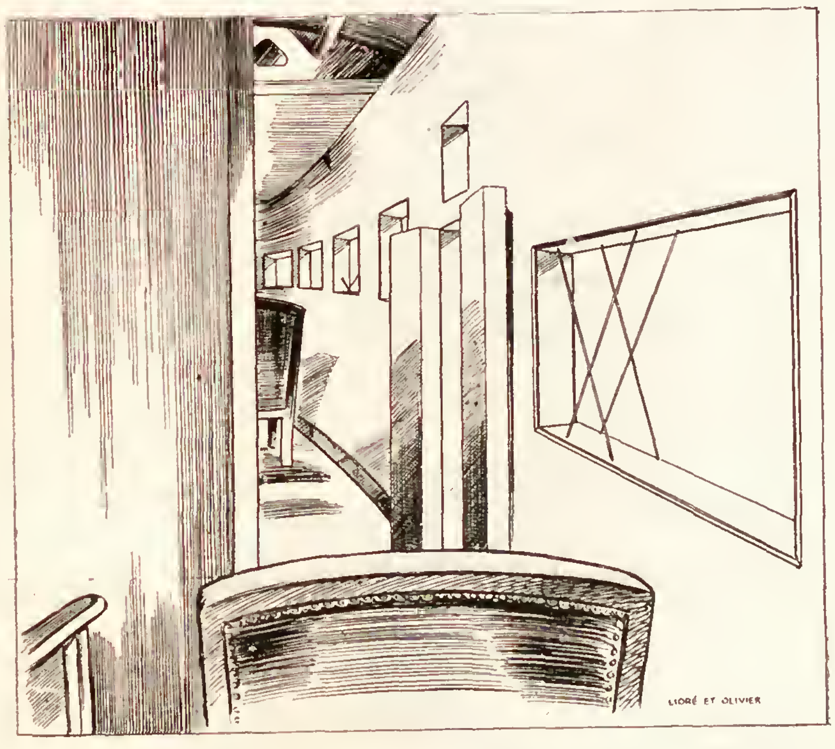
Marseilles-Madagascar: The Liore and Olivier LeO H.190, with "Jupiter" engine, was the type used in the flight across Africa. Behind the machine may be seen the tail of the large LeO 21 twin-engined commercial aeroplane.

["Flight" *Copyright*



The Liore and Olivier LeO 21 is a twin-engined commercial biplane with two "Jupiter" engines.

["Flight" *Photograph*



["Flight" *Copyright Sketch*

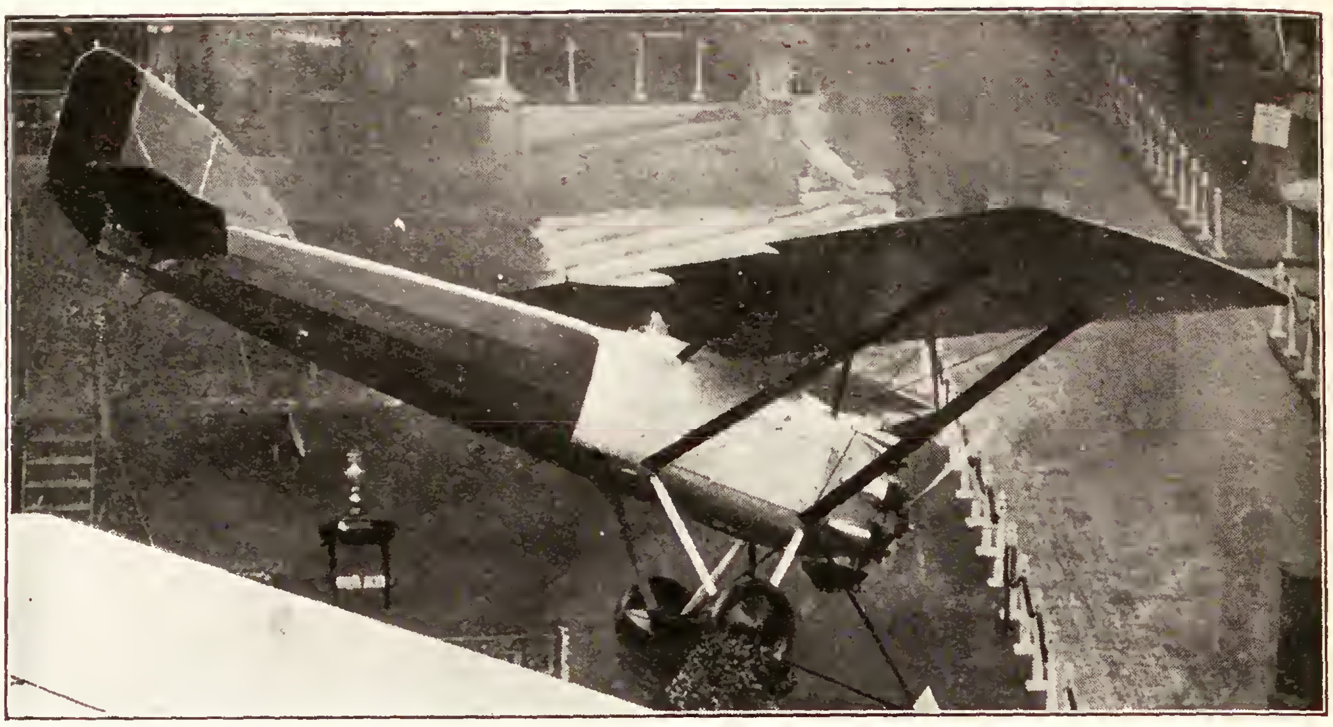
The cabin of the Liore and Olivier LeO 21 is partly divided by the pilot's cockpit. The same door in the starboard side gives access to both sections of the cabin.

a slightly modified version of the LeO 20 three-seater night bomber, recently adopted by the French Military Air Service. An unusual feature of the machine is that the undercarriage consists of two entirely independent units, one being placed under each engine, in a forked structure with the wheel partially enclosed in a large mudguard. The cabin is divided by the pilot's cockpit into two separate compartments, of which the rear one accommodates 12 passengers and the forward one six passengers. This cabin arrangement is partly illustrated by a sketch.

LOIRE-GOURDOU-LESEURRE

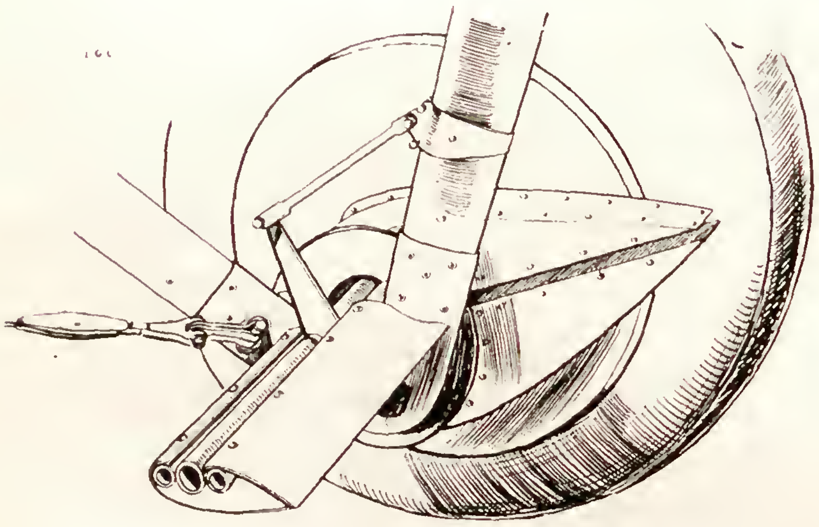
Considerable changes in the machines exhibited by this firm, as compared with those which it had been intended to show, and details of which were published in Flight of December 2, are to be recorded. Thus the L.G.L. 23 TS ambulance machine was absent from the stand, while in place of the 33 C.1 with 450 h.p. Lorraine engine, a type 35 C.1 with Renault engine was shown. The type 32 C.1 previously described in Flight was exhibited in the manner beloved by French constructors, *i.e.*, on a steeply banked turn, but its proximity to the floor made this attitude look rather alarming.

Generally speaking, the L.G.L. machines are very much alike, whatever the type, in that they are parasol monoplanes with strut bracing, a good deal like the Morane-Saulnier machines in appearance, although we believe quite different in detail construction. The fuselage construction is of the welded steel tube type, while the monoplane wings have duralumin spars and wood ribs.



The L.G.L.32 C.1, with "Jupiter" engine, was exhibited in a somewhat alarming attitude.

[" FLIGHT " *Photograph*



[" FLIGHT " *Copyright Sketch*

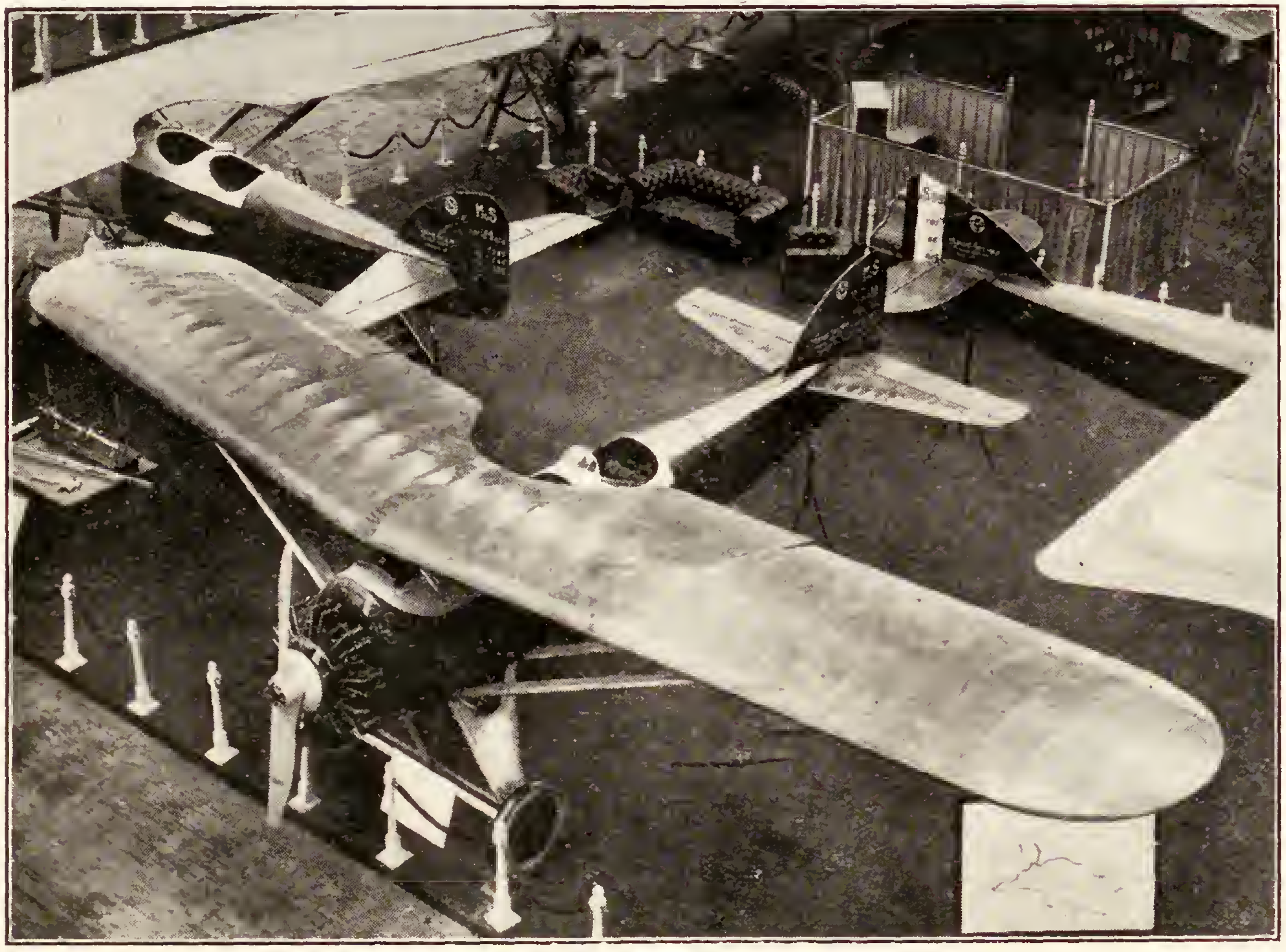
The shock-absorbers on the Loire-Gourdou-Leseurre machines are enclosed in fairings, the crank shown being intended to prevent axle and fairings from turning.

The fuselages are very long and slender, a fact that may help to improve the effectiveness of the rather small tails. The wing bracing struts have short steadying struts to the wing spar, a feature of which we personally are not very much in favour.

A feature of the L.G.L. undercarriages is that the shock absorbers are enclosed in streamline casings, a short crank anchored to the undercarriage leg preventing the axle and casings from turning, as shown in one of our sketches. The two L.G.L. machines were not exhibited with armament, but this consists of two fixed guns firing through the propeller, and two more fixed guns mounted on the wing and firing above the propeller. The wing structure has been specially stiffened against the recoil of the two wing guns.

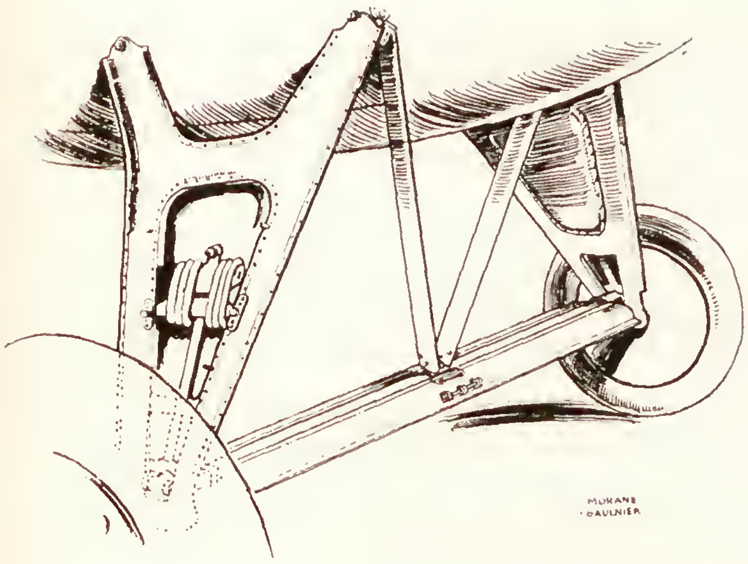
MORANE-SAULNIER

THE three parasol monoplanes exhibited on this stand were all of the same general type, the main differences being in the power plants and, in the case of the 35 EP 2, wire bracing above and below the wing, as compared with the rigid strut bracing of the other two types. The machines are very popular in France for school work and touring, and this firm has had such lengthy experience of this class of work that it may be expected to know exactly what is required. The



The Morane-Saulnier exhibit consisted of three parasol monoplanes, of which the type 132, with 120 h.p. Salmson, is shown in the foreground.

[" FLIGHT " *Photograph*



[" FLIGHT " *Copyright Sketch*

The Morane-Saulnier monoplanes have their shock-absorbing gear enclosed in the undercarriage legs.

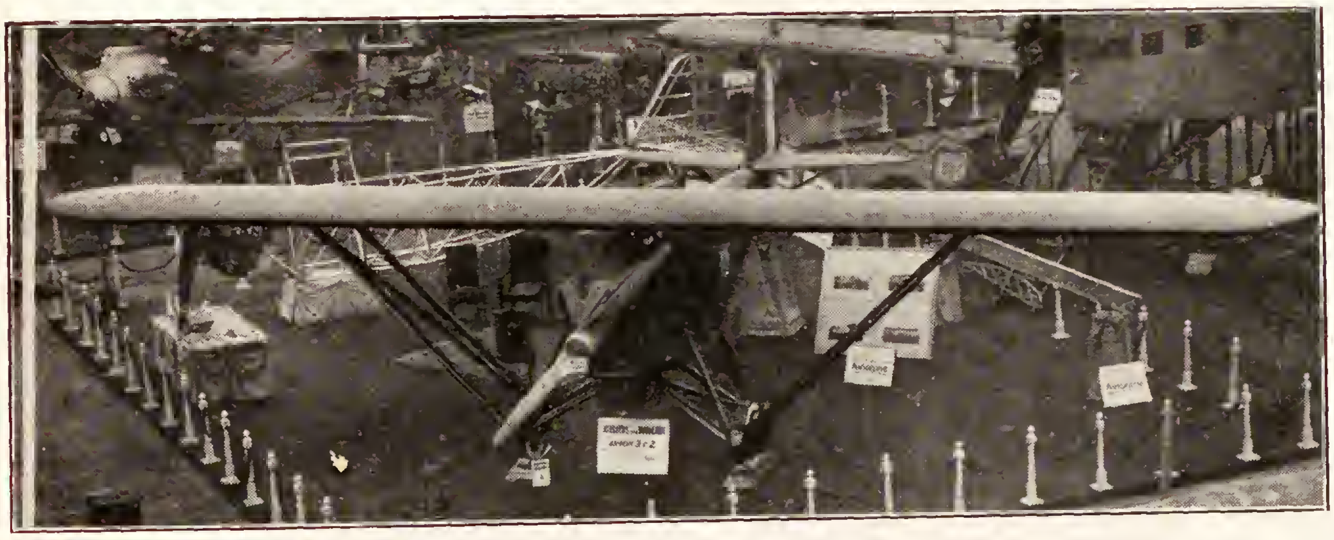
type 129 E.T. 2 can be said to represent the accumulated experience of the firm as far as school machines are concerned, the letters E.T. representing the words *Ecole de Transition*, the type being intended for intermediate school work, forming a stepping stone between the E.P. (*Ecole Primaire*) type and the more powerful machines. The third machine shown, type 132, is intended mainly for touring, but can also be used as a school machine. As is usual with Morane-Saulnier aeroplanes, the workmanship and finish are excellent. Of special constructional features there are few which are not well known, but the rather neat arrangement of the shock absorbers inside the fuselage leg is worthy of mention, and is illustrated by a sketch.

ATELIERS DES MUREAUX

IT may, perhaps, be remembered that at a previous Paris Aero Show the Ateliers des Mureaux exhibited a Vickers-Vimy commercial aeroplane. This year the firm showed a machine of its own design, and a skeleton fuselage illustrating the construction. The complete machine was a parasol monoplane two-seater fighter, type 3 C.2. This was substituted for the *Avion Marin* which, as recorded in our issue of December 2, it had been intended to exhibit.

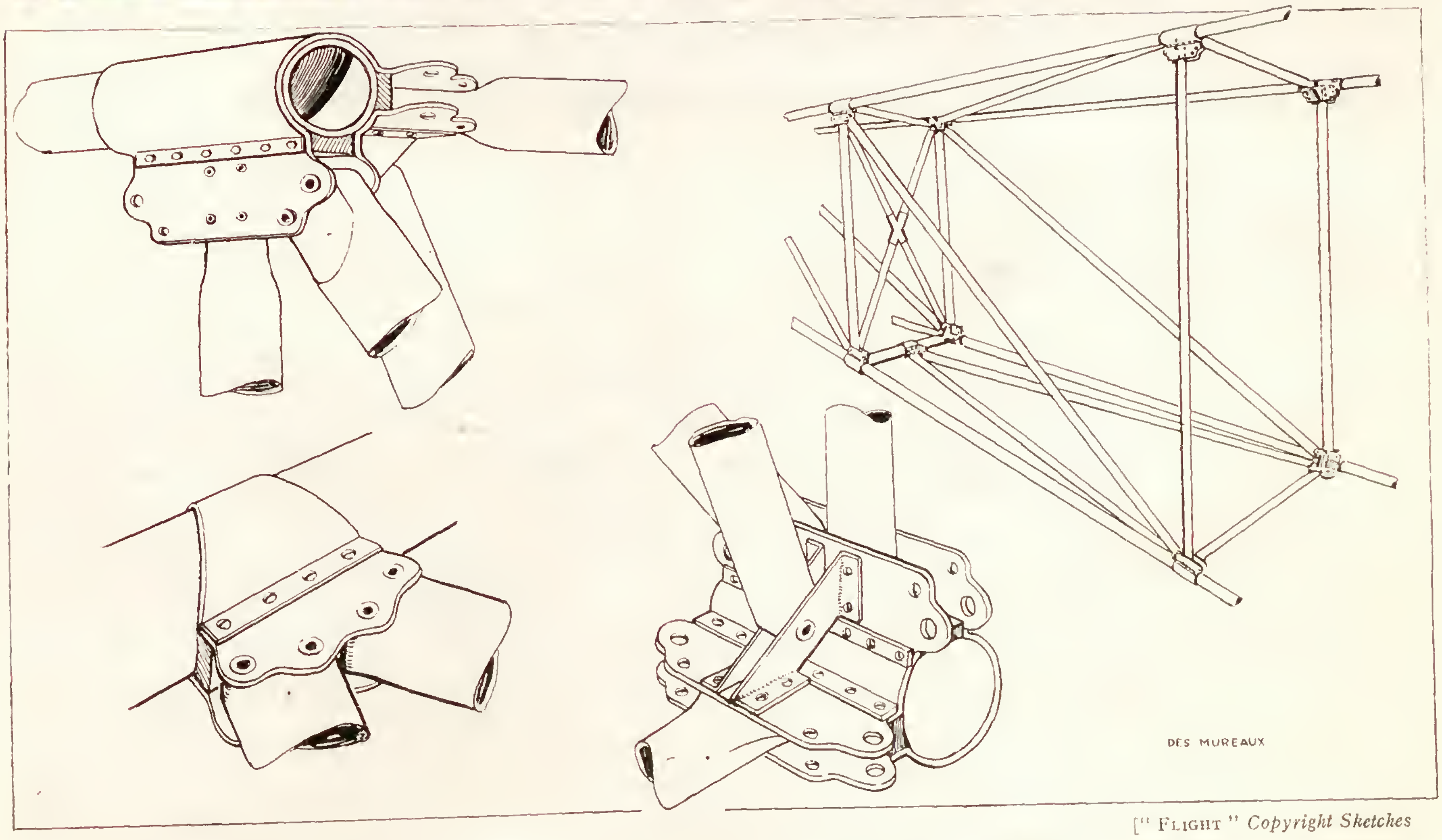
The machine has a very unusual arrangement of its wing and undercarriage bracing, as the photograph and sketch will show, and it is difficult to see what advantage the designers expect from such a forest of struts. The wheels are each carried in a duralumin frame, which is in turn supported from fuselage and wings. The travel of the wheels is obviously very limited, while it seems probable that the air resistance of all these struts at the points where they converge must be very high indeed owing to " interference effects."

Details of the fuselage construction are shown by sketches. It will be seen that the form of construction, with plain



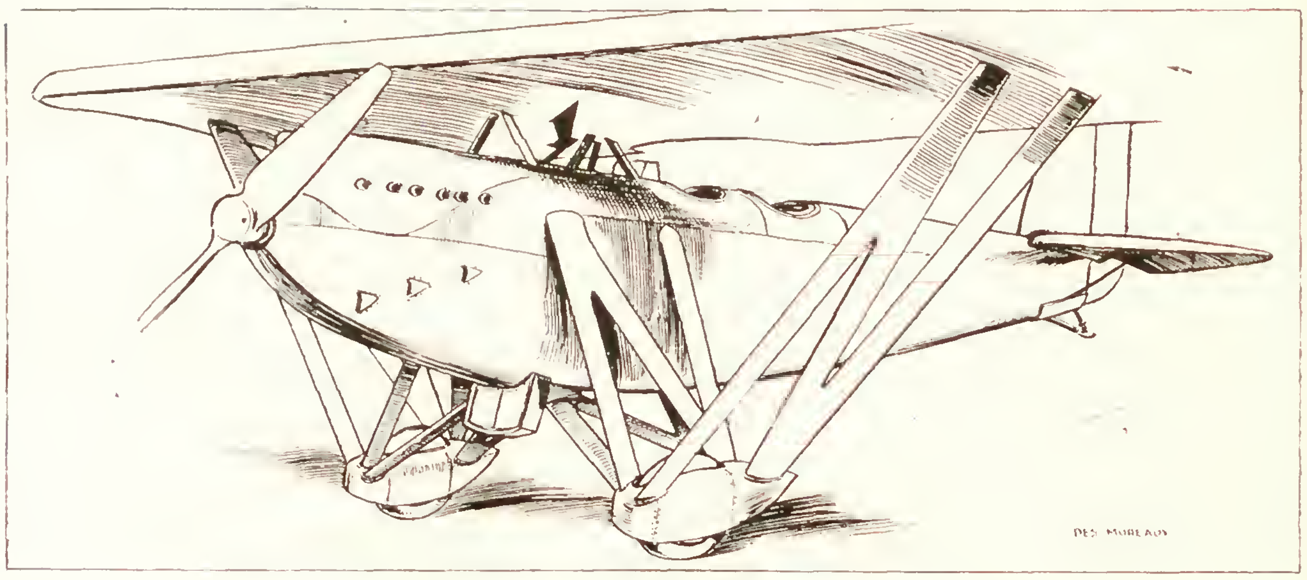
The Ateliers des Mureaux exhibited a type 3C2 with unusual monoplane wing bracing. Behind it may be seen the skeleton of an all-metal fuselage.

[" FLIGHT " *Photograph*



[" FLIGHT " *Copyright Sketches*

Simple metal construction at Paris Show. These sketches show the details of the form of fuselage construction used on the Ateliers des Mureaux machines. Compared with some of the metal work exhibited, this particular form is simple and should be cheap.



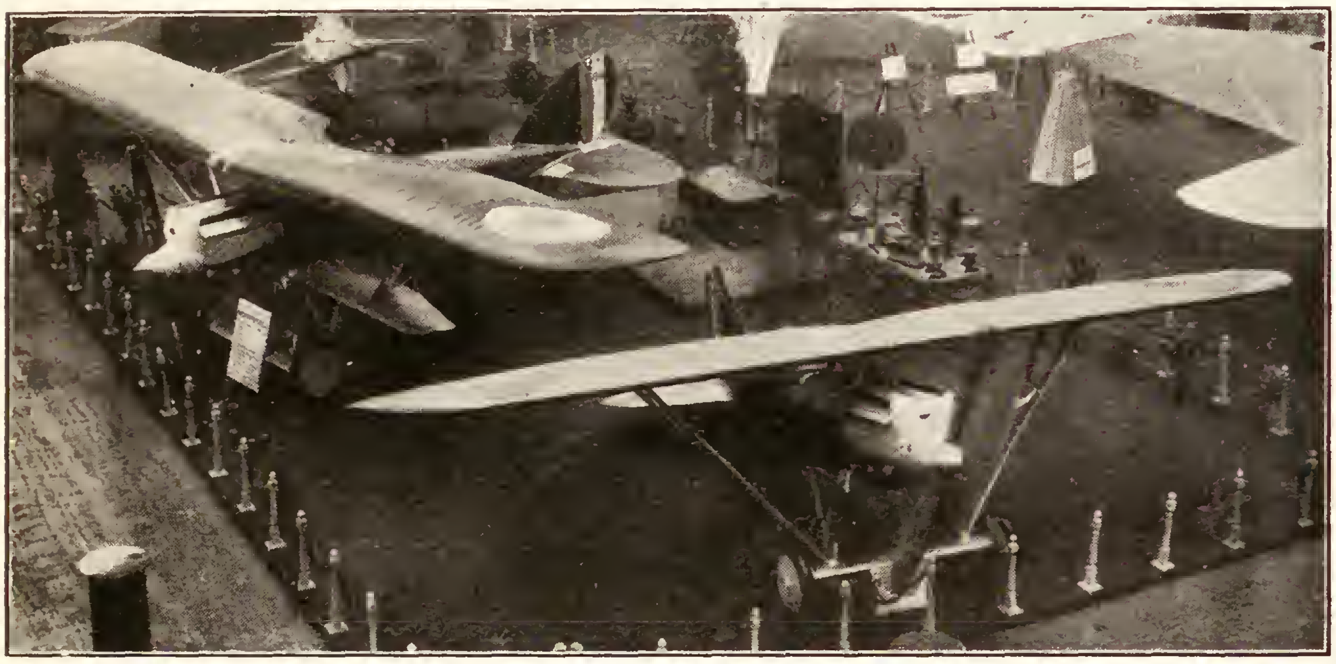
The 3 C.2 two-seater fighter of the Ateliers des Mureaux is a parasol monoplane with unusual wing bracing.

[" Flight " *Copyright Sketch*

duralumin tubes and plain sheet fittings, is very simple, and might have a good deal to recommend it if applied to a more commonsense general design.

NIEUPORT-ASTRA

The two machines exhibited by this firm were generally similar, the type 42 C.1 being the older type, while the type 48 C.1 is the very latest product of M. Delage, the firm's chief designer. Both machines are of typical Nieuport-Delage lines, and the main difference between them is that in the type 48 the small lower plane has disappeared altogether. The wing bracing is in the form of a single " Y " strut on each side, the struts being built up from sheet duralumin of fairly thick gauge, but without internal stiffening. As is usual, the machines were beautifully finished, and it is worth noting that the cockpit arrangements were among the best in the show, a very great deal of trouble having quite obviously been taken to ensure the best lay-out for the instruments, armament, etc. A feature of both Nieuport-Delage machines is the duralumin " backbone " unit, to which all the main weights such as engine, undercarriage, crew, equipment, etc., are attached, and for which the *monocoque* rear portion of the fuselage forms but a streamline fairing.

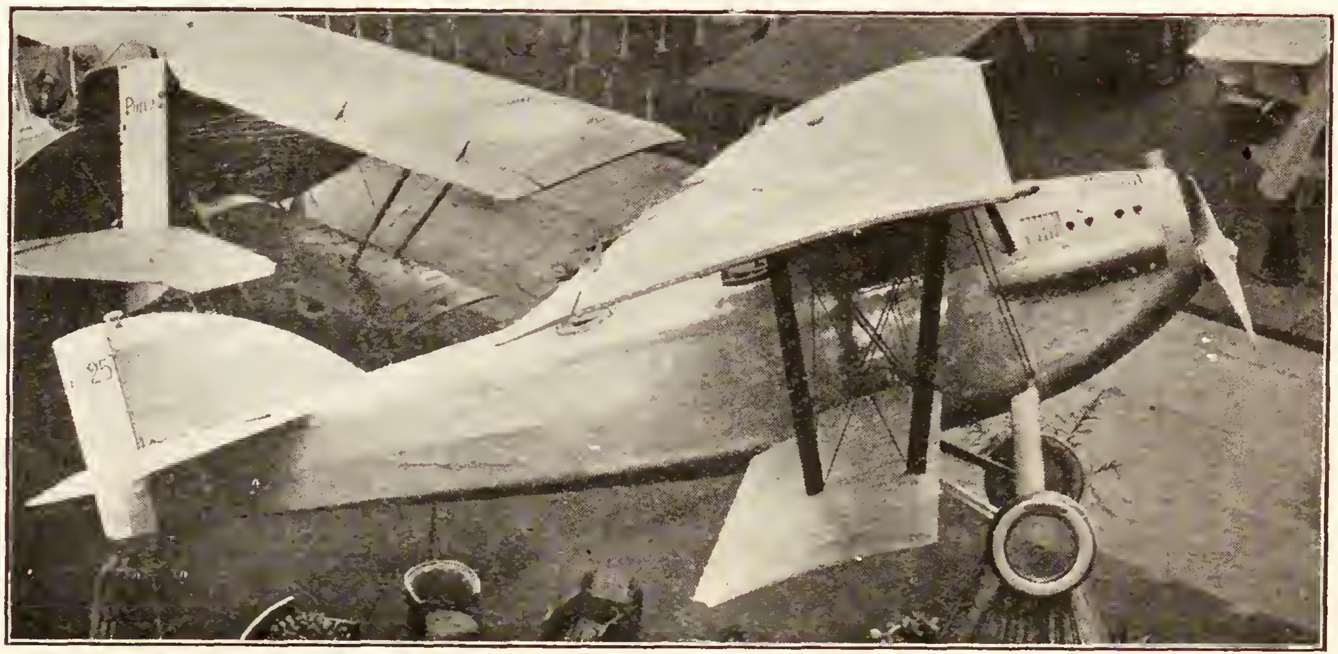


The two Nieuport-Delage fighters. On the left the type 42C1, a " sesquiplan," and on the right the new 48C1, in which the diminutive lower wing has disappeared altogether. These machines had uncommonly fine cockpit arrangements.

[" Flight " *Photograph*

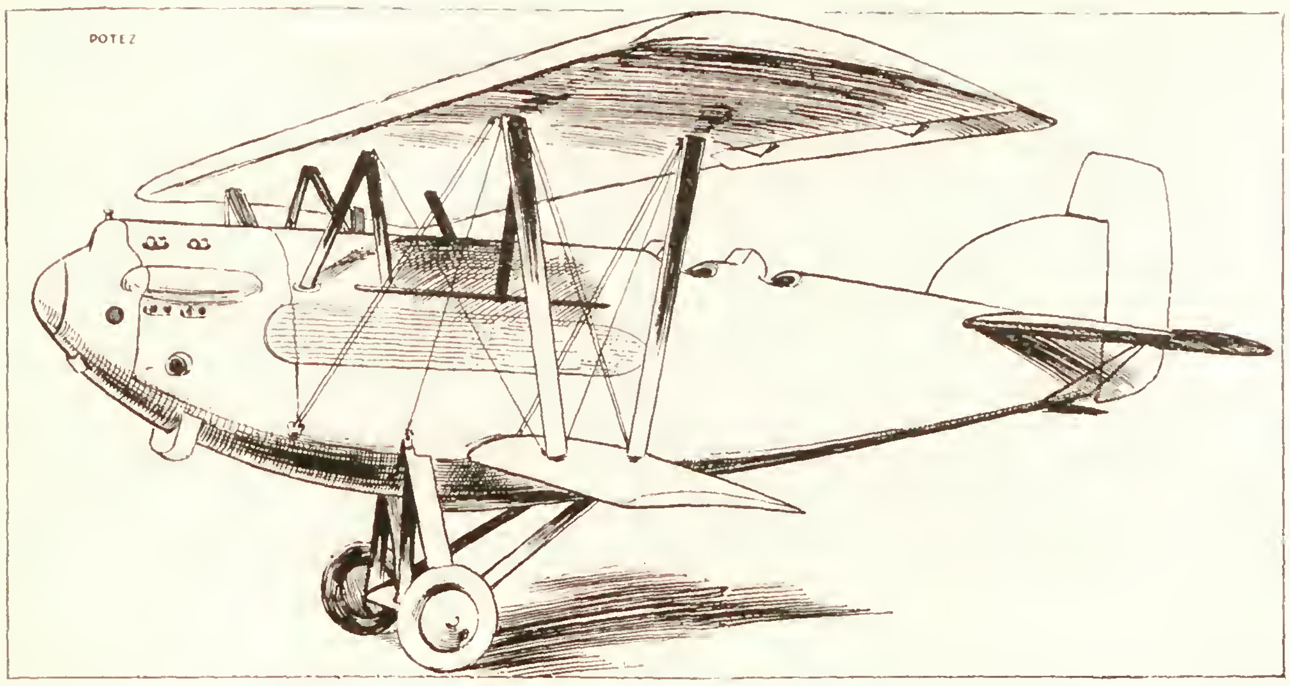
HENRY POTEZ

Although one of the younger of French aircraft firms, the Potez Company has managed to establish for itself an excellent reputation for good work, and their machines are



The Potez 25 Army-Co-operation biplane is of recent design.

[" Flight " *Photograph*



The H. Potez 28 G.R. long-distance reconnaissance biplane is, in spite of its large span, a single-bay machine. The belly of the fuselage contains extra fuel tanks.

[" Flight " *Copyright Sketch*

always on sound straightforward lines. Large numbers have been supplied, not only to the French air services, but also to those of many foreign powers, including the Little Entente, Denmark, Esthonia, Japan, Spain and Portugal.

The three Potez machines exhibited at Paris were all generally similar in design, *i.e.*, single-bay biplanes with small bottom plane and large top plane, and struts raked outwards at a pronounced angle. Most impressive of the three was, perhaps, the 28 G.R. (the letters indicate *Grand Raid* or *Grande Reconnaissance*), with 550 h.p. Renault engine. This machine is shown in a sketch. It was, it might be mentioned, on this machine that the brothers Arrachart established a new world's distance record by flying from Paris to Basra non-stop. The record has since been beaten, but the flight was undoubtedly a most meritorious one. The machine is chiefly remarkable for its large size (for a single-bay biplane) and for the large petrol tanks housed in the " belly " of the fuselage. Both cockpits are placed very far aft in the machine, and one would imagine that the view is not as good as in the smaller Potez machines.

The Potez 25 G.R., with 450 h.p. Lorraine engine, is almost identical with the third machine shown, the 25 A2, but carries no armament, and has a much larger petrol capacity, as will be seen from the data given in our December 2 issue. The 25A2, it should be pointed out, is the standard French Army co-operation machine. It is equipped with four machine guns, one firing through the propeller, two on a gun ring, and one firing through the floor towards the tail.

A feature of all Potez machines is the detachable engine units, and two such were shown on a stand. These detachable engine mountings are of very simple form, and attach to the main fuselage structure at four points only, thus rendering the operation of changing an engine a very simple one. These engine mountings are of heavy gauge duralumin, by the use of which practically no bracing, " crinkling," or other aids to stiffness are required.

SALMSON-BECHEREAU (S.R.A.P.)

From the side view of the Salmson-Bechereau C.2, published in our issue of December 2, it was difficult to realise the complication of the strutting which a closer inspection of this machine at the show revealed. M. Bechereau, it may be recollected, is an old hand at designing aeroplanes, having been responsible for the design of the Deperdussin monoplanes in the very early days of aviation, and during the war of the early Spads. With an experience like that behind him, one is justified in expecting from a designer a really fine piece of work, but frankly the machine exhibited on this stand could scarcely be so described as regards its design. One of our sketches this week shows the general scheme of the wing bracing, and it will be seen that this is of such a nature that there must be a good deal more strut area offering resistance than need be incorporated in a biplane with orthodox bracing. Unless the demand is, for some service reason not entirely obvious, a parasol monoplane at all costs, it is difficult to guess what was in the designer's mind. The fuselage is of excellent streamline form, and that the machine must be aerodynamically efficient in spite of its excessive amount of strutting, seems obvious from the official performance figures published in our December 2 issue, according to which the speed at 10,000 ft. is 220 km./hr. (136·6 m.p.h.). One cannot help thinking that with the same fuselage neatly put into a biplane structure an even better performance would have been obtained.

On this stand was also exhibited the fuselage of the Salmson-Bechereau mail aeroplane. Constructionally this machine, like the two-seater fighter, is of fairly orthodox construction, and neither machine calls for comment on this score. It was noticed, however, that in the case of both machines, and particularly in the case of the mail aeroplane, the rudder was of very small area.

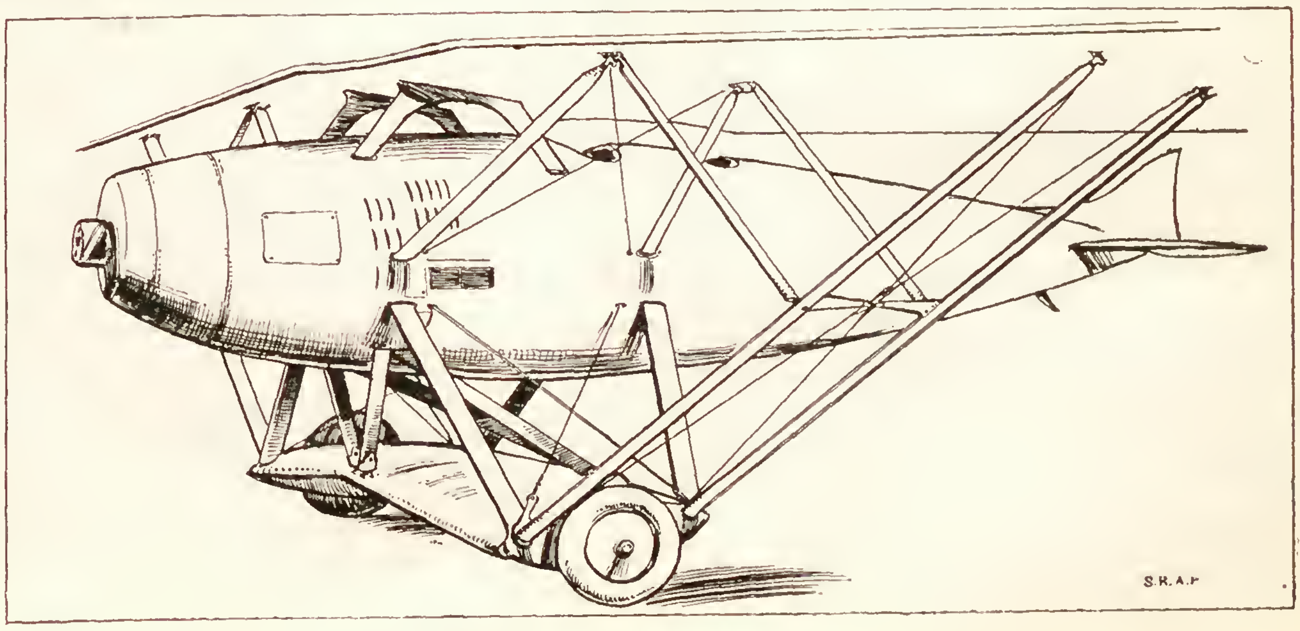
SCHRECK—F.B.A.

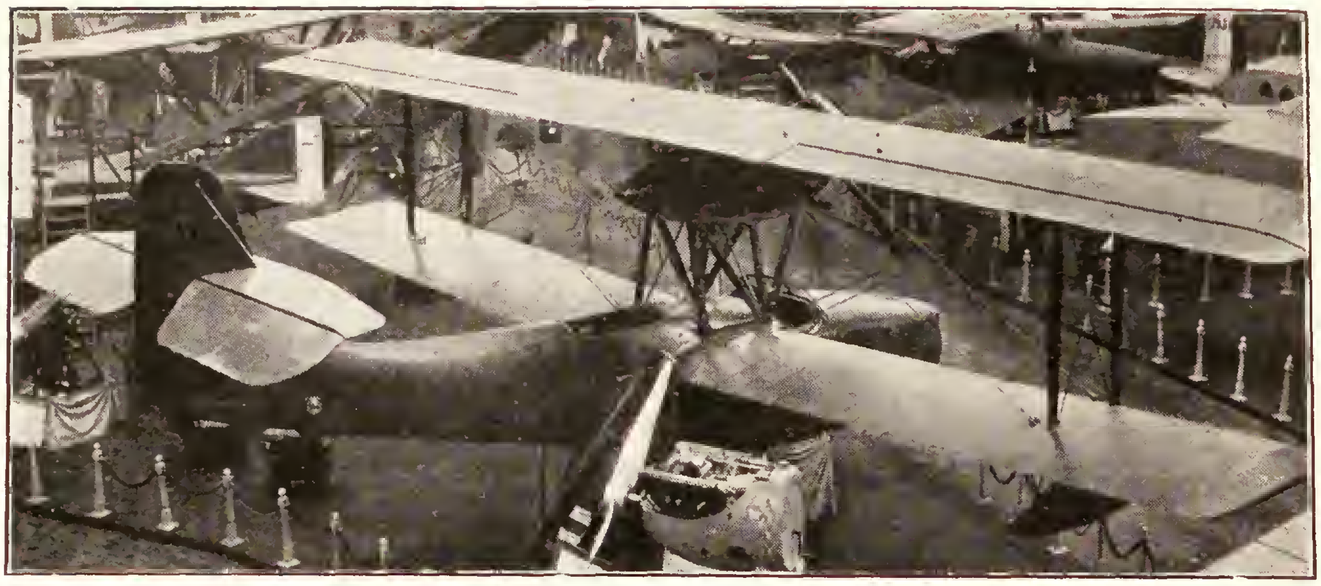
The machine exhibited by this firm (incidentally when the Company was founded the initial letters signified Franco-British Aviation Co.) is a single-engined amphibian flying-boat fitted with 450 h.p. Lorraine-Dietrich engine. The machine is of familiar F.B.A. design and construction, and it may be pointed out that it was this type which won the prize for commercial seaplanes in 1925 and a similar type established a world's altitude record carrying a load of 1,000 kg.

The F.B.A. 21 H.M.T.6 is unusual in so far as it is a commercial machine with the four passengers accommodated

The Salmson-Bechereau two-seater fighter has an unusual strut arrangement. Both the main wing and the auxiliary wing supporting the undercarriage are set at a negative dihedral angle.

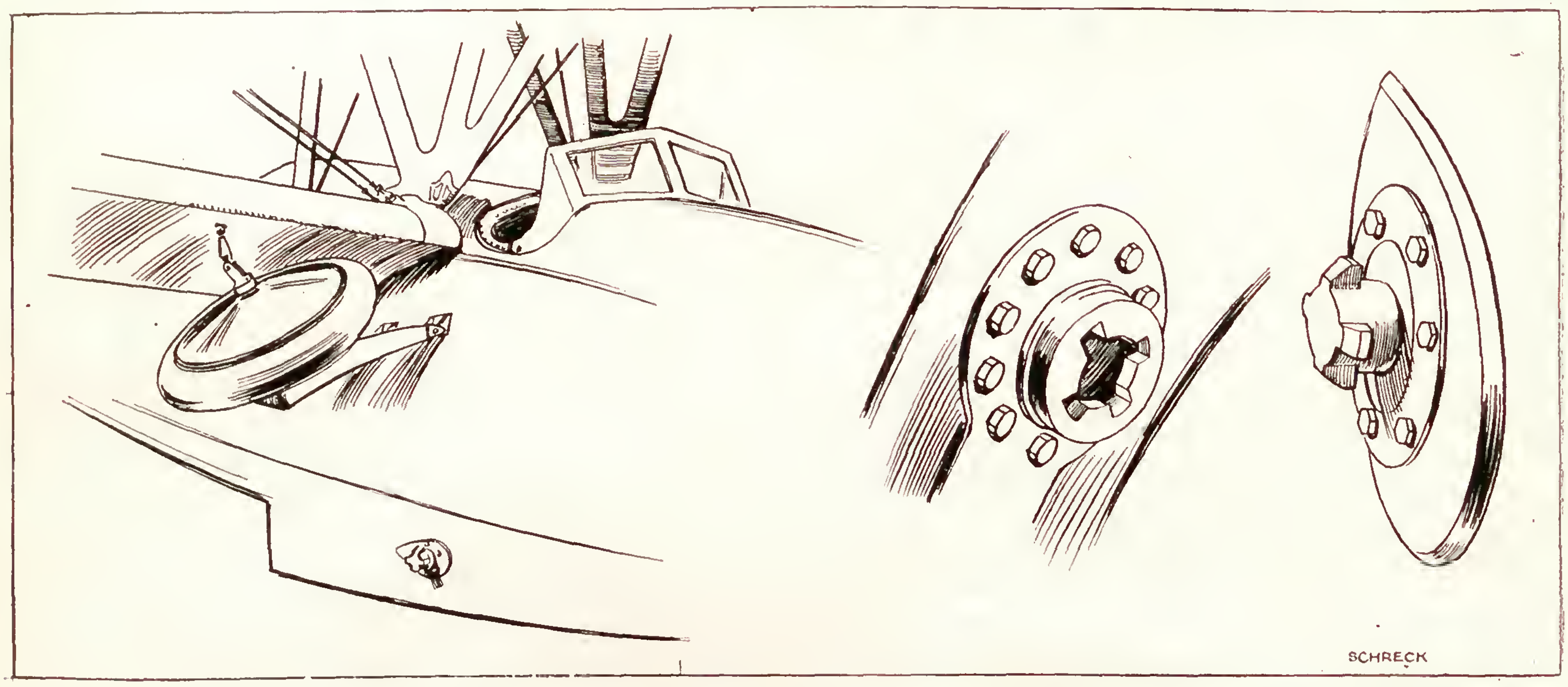
[" Flight " *Copyright Sketch*





The Schreck-F.B.A. amphibian has an open cockpit for passengers behind the wings, while the pilot's cockpit is in front. This type of machine won the competition for commercial seaplanes in 1925.

[" FLIGHT " *Photograph*



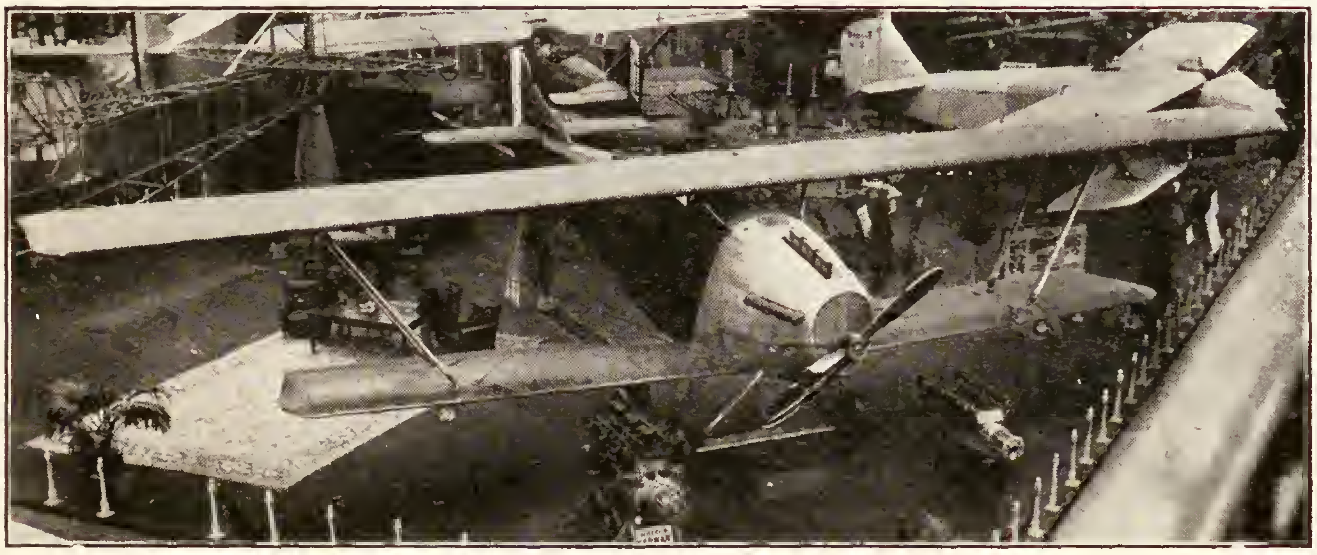
[" FLIGHT " *Copyright Sketches*

The undercarriage of the Schreck F.B.A. amphibian is raised by cables passing through the lower plane. When the wheels are lowered they are secured in position by the device shown, the male portion being mounted on the sides of the boat hull.

in an open cockpit behind the wings. This position of the passengers is undoubtedly one of the safest which it was possible to arrange for, but one would expect the open cockpit to be rather draughty, especially as the tips of the tractor airscrew come down almost to the deck in front, so that there will probably be a considerable amount of slip stream felt even aft of the wings. Otherwise the arrangement seems to have much to recommend it. The cockpit for the pilot and navigator is situated ahead of the wings, and the large windscreen fitted is probably by no means an unnecessary part of the equipment. The machine is otherwise of normal design, and the only feature which calls for comment is the retractable undercarriage. The details of this are shown in a sketch. The undercarriage legs, which are in the form of multi-ply wood formers, are hinged to the sides of the boat hull and are raised towards the wings by means of cables passing inside the lower plane. When the pilot turns a shaft in the cockpit the wheels are lowered towards the side of the boat, where they are locked in position by means of a form of bayonet joint, the shape and arrangement of which are shown in the sketch. This type of retractable undercarriage has been in use on F.B.A. machines for several years, and it is understood that it can be fitted to any of the firm's machines with the exception of the school types.

S.E.C.M.

ONE military and one commercial aeroplane formed the exhibits on the stand of this firm. The military machine



The S.E.C.M.-Amiot 120 B.N.2 is a long-distance two-seater night-bomber with 600 h.p. Renault engine. It is of all-metal construction.

[" FLIGHT " *Photograph*

Per Napier ad astra!

World Records *for* Napiers

TWO World seaplane records have been granted by the Fédération Aéronautique Internationale to the Heinkel-Napier seaplane fitted with 450 h.p. Napier engine.

Carrying a load of 500 kilogrammes this machine reached a height of $3\frac{1}{2}$ miles, whilst with a load of 1000 kilogrammes an altitude of $2\frac{3}{4}$ miles was attained.

These records were obtained with the identical machine as that which secured First Prize in the German competition to discover the best German commercial seaplane.

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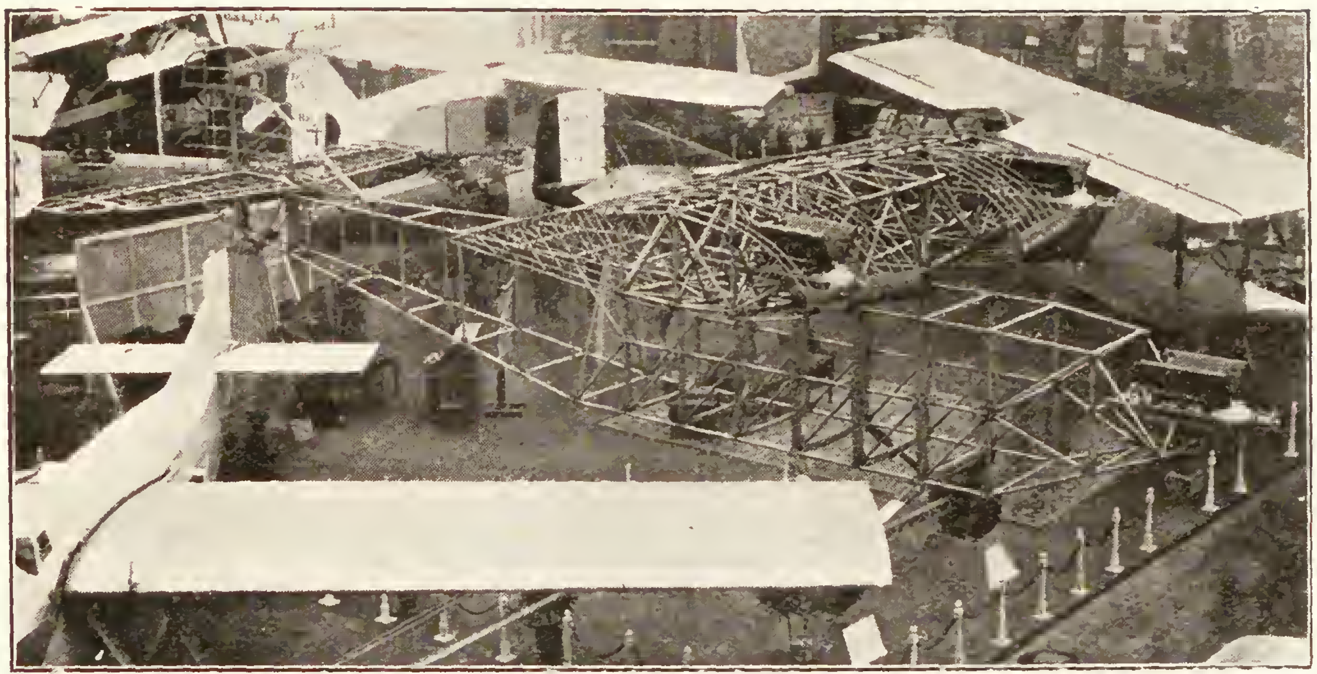


The S.E.C.M. 150 T commercial machine, of which only the centre portion was exhibited (in skeleton). The wing construction is somewhat similar to the Junkers.

[" FLIGHT " *Photograph*

is a single-engined night bomber two-seater with 600 h.p. engine. Like all S.E.C.M. products the machine was of all-metal construction, the fuselage being built up of metal tubing, whilst the wings had " N " girder spars of the type produced by this firm for several years. The machine was chiefly remarkable because of the fact that it was, in spite of its large span, a single bay biplane, the interplane struts being raked outwards at a very pronounced angle, due to the fact that the lower plane is of very much shorter span than the top. As distinct from so many French aeroplanes having a short bottom plane, the wing bracing is of orthodox type, and does not show the usual arrangement of lift wires running from the lower plane to the undercarriage, which seems to be so popular with French designers at present.

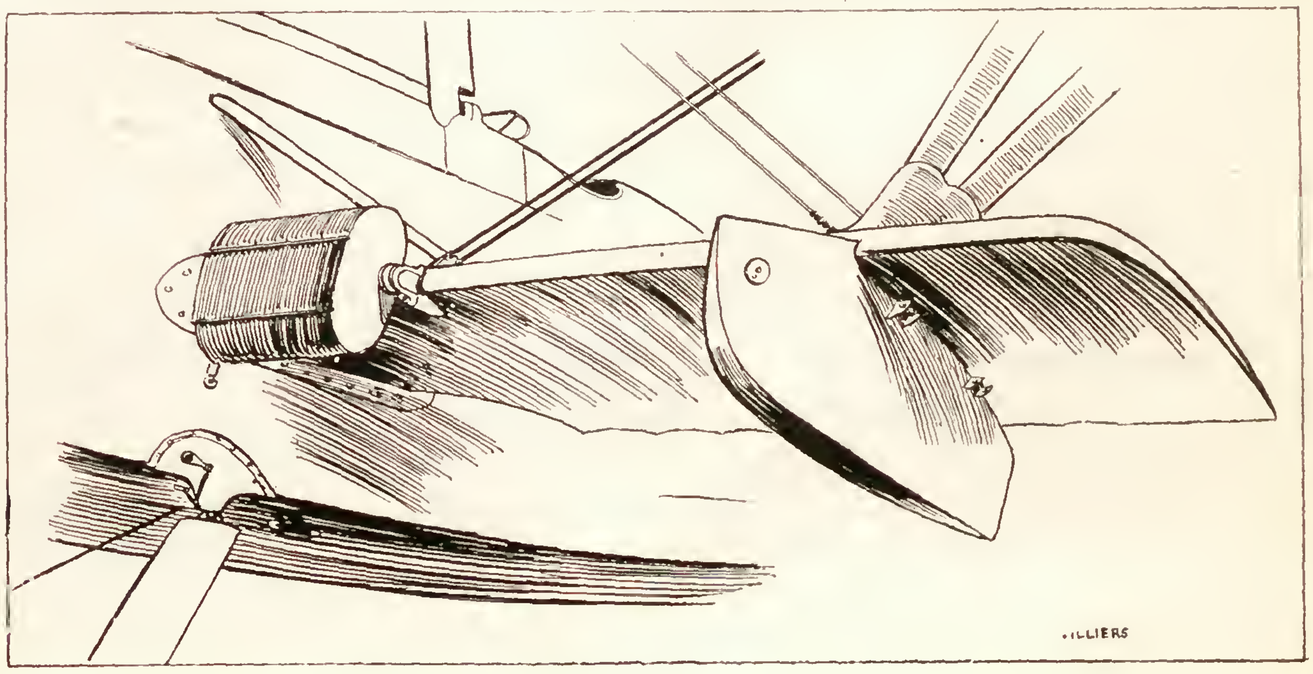
Of the second machine of this stand only the centre portion was shown, and this was exhibited in skeleton. It is to be a large commercial Vee-engined machine with three Hispano-Suiza engines. The fuselage is of typical S.E.C.M. tubular construction, in which the joints between struts and longerons are formed by wrapping metal sheet around the struts and longerons. This is a form of construction which the S.E.C.M. Company has developed to a high art, and which is certainly beautifully carried out, although it is a little difficult to see the necessity for this complication. The wing structure looks at first glance, somewhat like the well-known Junkers type with multiple tubular spars, but in reality it is quite different. To begin with, the main wing structure does not extend over the entire chord as is the case in the Junkers machines. It stops short aft at approximately mid-chord, while in front there is a separate leading edge formed of sheet metal. Moreover, when the structure is examined in detail, it is found that the top and bottom tubes of the spars occur one above the other, whereas in the Junkers construction a top tube occurs approximately above the midway point between the two lower tubes and vice versa. The method of joining all the various tubes together is also quite different from that used by Professor Junkers, and takes a form similar in general principle to that employed in the fuselage construction, with sheet metal wrapped around the joint. One such joint was exhibited on the stand, and showed a large number of tubes meeting at a point. It was impossible not to admire the skill and craftmanship which had enabled this joint to be made, but it is difficult to discover the necessity for going to such complicated methods of joining tubes together. From what will be gathered by inspecting the centre portion of this machine, the cantilever monoplane wing will have a very pronounced taper. The undercarriage appeared to be of the type in which the axle itself is rigidly mounted, but it was not possible to see whether or not shock-absorbing gear was incorporated inside the wheels. A photograph of a wheel, however, showed shock absorbers incorporated, although one doubts whether this type of wheel was actually used on the machine as exhibited.

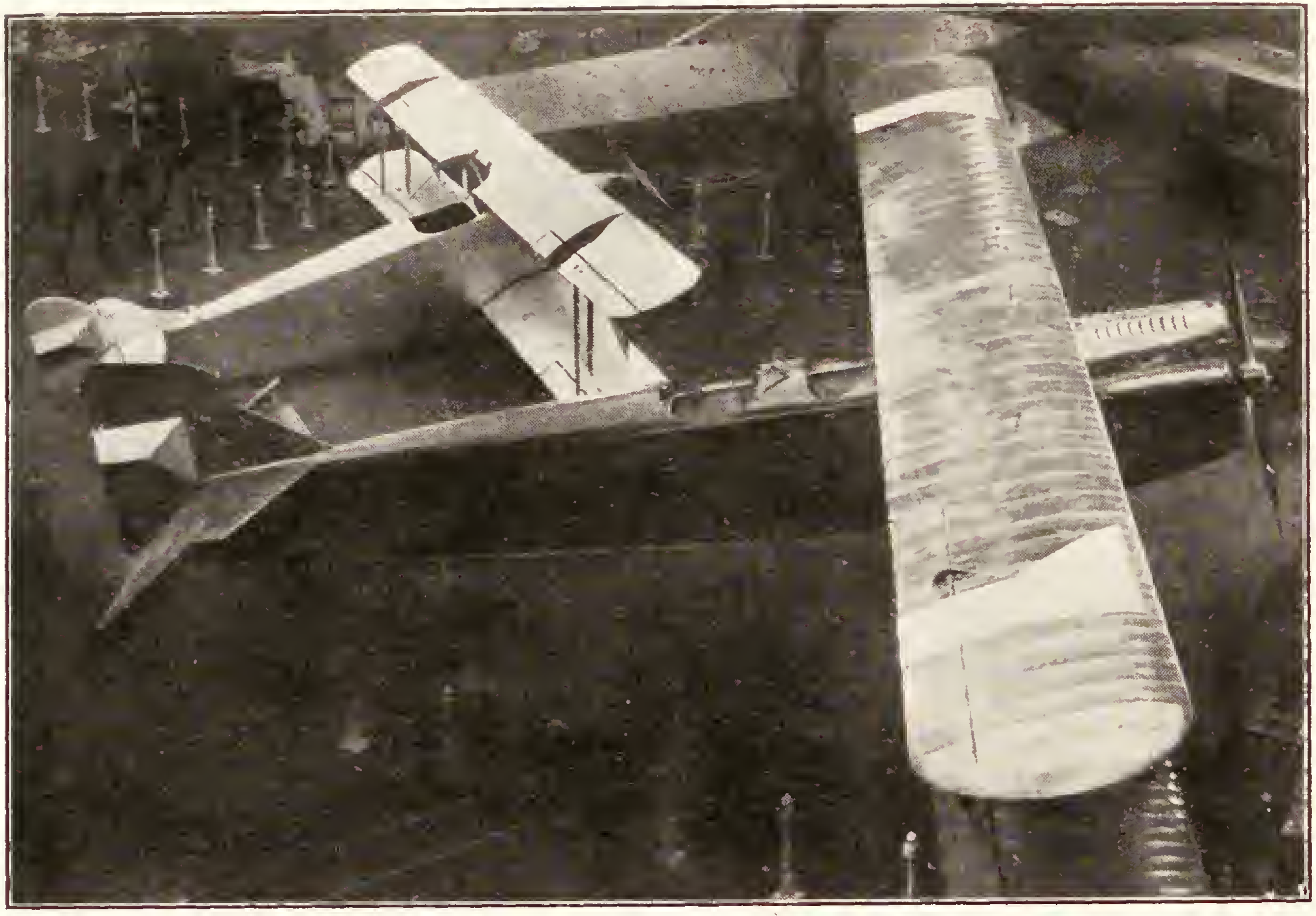
VILLIERS

Two machines were exhibited by Francois Villiers, a comparative newcomer to the French aircraft industry. Of these one, the Villiers type No. 11 C.2, was an *avion marin* of the type designed to be able to alight on the sea in case of engine trouble. This machine is similar to other French machines of its class in that the undercarriage, a wood structure, is watertight so as to provide sufficient flotation to keep the machine from sinking until it can be picked up. The bottom plane, which is of smaller span and chord than the top plane, is attached to the watertight fuselage approximately halfway up the sides, or roughly at the level of the water line, and two wing tip floats provide lateral stability when the machine is at rest on the water. The undercarriage can be dropped before alighting in the sea, the propeller being locked in a horizontal position. The machine is otherwise of orthodox design, the only unusual feature being necessitated by the purpose for which the machine was designed. Owing to the raising of the bottom plane up to the centre line of the fuselage, the top

The Villiers " Avion Marin " has a very small bottom 'plane. Note the wing tip float and the Lamblin radiator on the leading edge. The undercarriage can be dropped, part of the release gear being visible in this sketch.

[" FLIGHT " *Copyright Sketch*





Two Vojenska machines. In the foreground the S.16, a long-distance reconnaissance biplane with 450 h.p. Lorraine engine. In the background the little S.18, a school machine with 60 h.p. Walter engine.

[" Flight " *Photograph*

plane is placed very high in relation to the body, doubtless in order to retain a good gap/chord ratio.

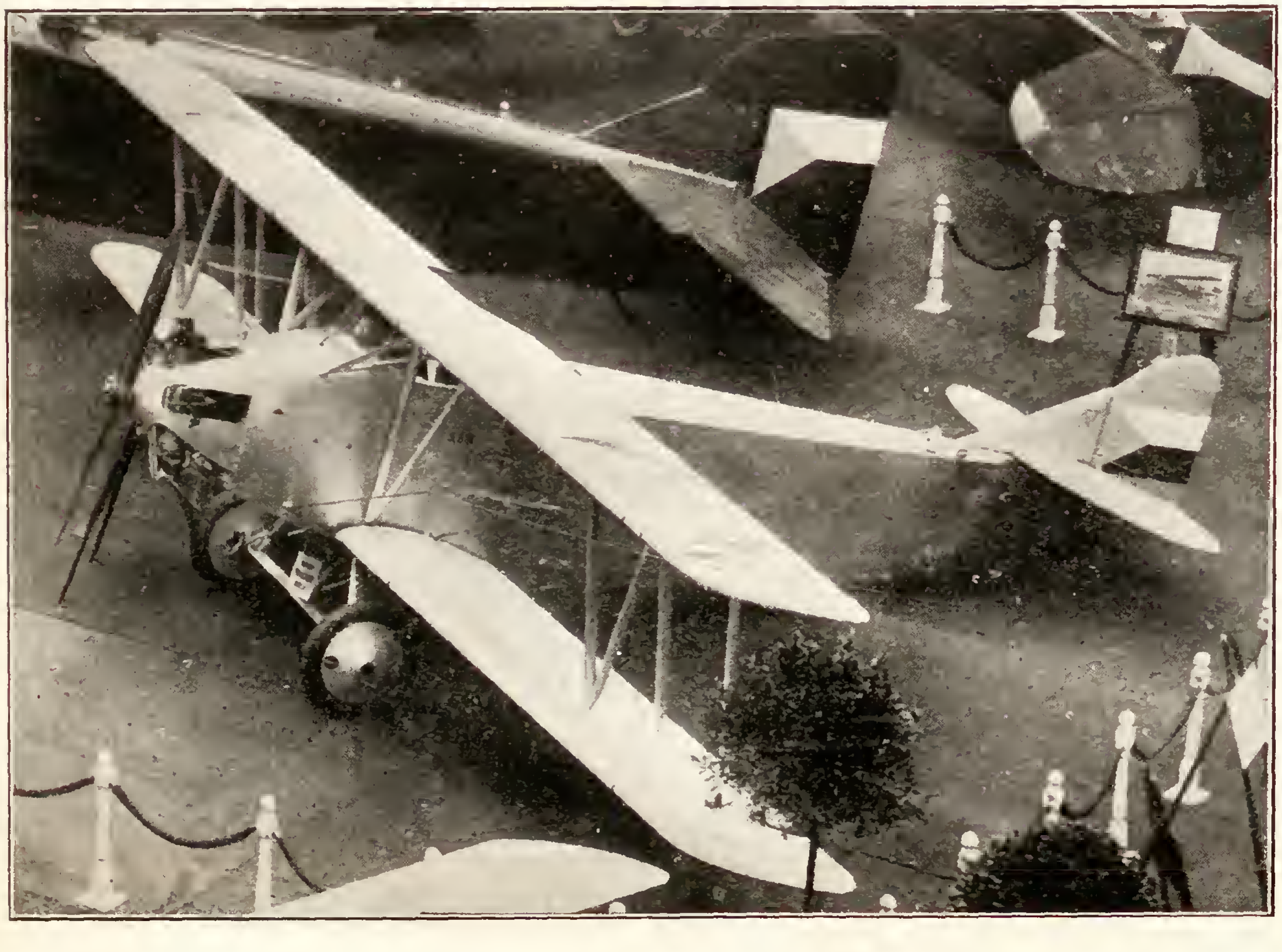
The other machine exhibited was a type V, two-seater night fighter equipped with landing lights and other equipment necessary to its function. In place of the Vee interplane struts of the *avion marin* the type V had single " I " struts built up of rectangular section duralumin tubes faired with sheet aluminium, and provided with incidence adjustment in the form of short rods from the main tube to the two wing spars. The machine is of normal construction, with ply-wood covered fuselage and wood wing spars and ribs. It is a clean-looking job and is credited with a top speed at ground level of 224 km./h. (139 m.p.h.).

VOJENSKA TOVARNA NA LETADLA

The Military Aircraft Factory of Prague was reported in our issue of December 2 to exhibit three machines. Actually, however, but two were shown, the " absentee " being the type S. 20 single-seater fighter with Skoda-built Hispano-Suiza. Presumably there was room for no more machines on the Czechoslovak stand, which already contained one Aero and two Avia machines.

Of the two machines shown by the Military Factory one was a little school machine with 60 h.p. Walter engine. This did not present any unusual features except in the arrangement of the wing bracing. Two of the accompanying photographs show the S.18, and from these it will be seen that the top plane is braced, in addition to the cabane struts, by a pair of Vee struts running to the point where the lower front spar meets the fuselage, whereas there is no attachment to the lower rear spar at this point.

The second Vojenska machine was the type S. 16, which is shown from above in one of our photos. A feature which at once attracts attention is the high aspect ratio of the



The Vojenska S.18 school machine with 60 h.p. Walter engine. The wing strutting is somewhat unusual.

[" Flight " *Photograph*

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wings, the span of which is 15·5 m. (50 ft. 10 in.) for an area of 47 sq. m. (506 sq. ft.). The machine which is a long-distance reconnaissance or day-bombing biplane, with 450 h.p. Lorraine-Dietrich engine, is of all-metal construction, the fuselage being built of steel tubes. The machine is of clean lines, and is credited with a top speed at ground level of 225 km/h. (140 m.p.h.). The ratio of empty weight to load carried is high, the former being 1,200 kg., and the latter 1,050 kg.

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THE CAIRO–KARACHI AIR ROUTE

On December 18 the first of the three D.H.66 "Hercules" air liners (three Bristol "Jupiter" engines) that have already been built for service on the Cairo–Karachi air route, left Croydon *en route* for Cairo. The machine set out at 7.45 a.m. with Mr. C. F. Wolley Dod and Mr. Warner as pilots, and Air Vice-Marshal Sir Sefton Brancker, Director of Civil Aviation, Air Commodore and Mrs. Weir, Capt. T. A. Gladstone, a mechanic and wireless operator, forming the crew. Capt. Gladstone, it may be mentioned, is journeying to Egypt in connection with the Khartoum–Kisumu air service. The "Hercules" made a good trip to Le Bourget, arriving at 9.28 a.m. and leaving again at 10.10 a.m. A stop for lunch was made at Dijon at 11.43 a.m., the journey being resumed at 1.51 p.m. *en route* for Marseilles. Owing to the lateness of the hour, however, a stop was made at Lyons, where the night was spent.

The next morning, at 9.40 a.m., the machine left for Marseilles, where it arrived at 11.5 a.m. The second "Hercules," piloted by Capt. Hinchliffe, followed No. 1 on December 20, whilst the third machine, as previously reported, will leave on December 27 with Sir Samuel Hoare, Secretary of State for Air, and Lady Maud Hoare, Air Vice-Marshal Sir Geoffrey Salmond (who is going to India to assume command of the R.A.F. in India), and Maj. C. Ll. Bullock, as passengers, officially inaugurating the service. "Hercules" No. 2 arrived at Marseilles on the afternoon of the same day it started from Croydon. (The D.H.66 "Hercules" was described in Flight for July 10 and November 4 last.)

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LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The total flying time during the week was 20 hrs. 30 mins. There were three blank days owing to fog and rain.

The following members received flying instruction :—J. J. Hofer, H. R. Presland, J. E. Sawyer, E. R. Wilson, M. P. Susman, H. Soloman, J. G. Crammond, A. J. Richardson, B. Roxburgh Smith, A. J. Lingard.

The following members had solo flights :—C. E. Murrell, H. Spooner, Lady Bailey, S. O. Bradshaw, N. Jones, L. J. C. Mitchell, J. H. Saffery, G. Terrell. G. C. Bonner, A. R. Ogston, O. J. Tapper, K. V. Wright. The following members had joy rides :—J. J. Hofer, Miss Wilson, Miss Morris.

The club will be closed down for one week from Thursday, 23rd inst.

The Hampshire Aeroplane Club

Report for week ending December 16.—Total flying time for the week, 8 hrs. 40 mins. Instruction flying, 6 hrs. 40 mins. ; solo flying, 1 hr. 20 mins. ; test flights for visibility, etc., 40 mins.

The following members had instruction :—Lieut. Heinemann, R.N. 1 hr. 25 mins. ; Cooper, 1 hr. 10 mins. ; Moloney, 40 mins. ; the Hon. H. R. Grosvenor, 40 mins. ; Everett, 50 mins. ; Dickson, 25 mins. ; Shepherd, 20 mins. ; Stokes, 15 mins. ; Nicholson, 15 mins. ; Kerry, 10 mins. ; Keeping, 10 mins. ; Burry, 10 mins. ; Preston, 10 mins.

The soloists were :—Lieut. Graham, R.N., 35 mins. ; Preston, 25 mins. ; Perfect, 10 mins. ; Keeping, 10 mins.

Morning mist has been a nuisance several times this week, and, in consequence, we are thinking of adopting the Lancashire Club's test for visibility, and would appreciate the loan of the telescope and half-crown which they used for that purpose. We have a perfectly good Scotsman in the person of McCracken, who could be relied upon to do the observing of the coin.

There is one slight drawback to this test as applied to the Hampshire Club, in that our instructor also hails from north of the Tweed, and therefore it may be difficult to induce him to leave the ground in case he should lose sight of the half-crown.

To enable the staff of this club to enjoy a well-earned rest, the premises will be closed from Thursday, December 23, to Wednesday, December 29, inclusive.

Lancashire Aero Club

Report for week ending December 18.—Total time for week, 9 hrs. 30 mins., made up as follows :—Dual with Mr. Brown : Messrs. Wade, 1 hr. 20 mins. ; Crosthwaite, 50 mins. ; Birley, 40 mins. ; Leigh, 35 mins. ; Hughes, 30 mins. ; McNair, 25 mins. ; Fallon, 25 mins. ; Miss Emery, 25 mins. ; Messrs. Newton and Harper, 20 mins. each ; Hargreaves, Dobson, Anderson and Nelson, 15 mins. each ; Costa, 10 mins. Solo : Messrs. Lacayo, 45 mins. ; Costa, 15 mins. ; Goodfellow and Dobson, 10 mins. each. Joy-ride, with Mr. Costa : Mr. Torres, 20 mins. Tests : 50 mins.

There is really nothing amusing to record, unless one includes the fact that Mr. Dobson, our Mono engine expert, went solo on Wednesday. On the same day our chairman set off Helvellyn-wards on his super-Gosport, but had to turn back at Windermere on account of weather conditions. He got back to Woodford safely through a mixture of fog and snowstorm, which was quite a stout effort. In fact, it deserves another little parody, thus :—

John had
Great big
Oversize
Wheels on
John had a
Great big
O-le-
O.
John had a
Wonderful
Radial
Engine—
So "off"
(said John)
"We go."

I have been challenged to say anything original this week about our deplorable weather. As it is practically the sole topic of conversation among our members, it is obvious that the only original thing left to say about it is nothing, which I propose to say accordingly.

A happy Christmas and good landings to everybody.

Midland Aero Club, Ltd.

Report for week ending December 17.—The Meteorological people having enveloped the aerodrome in a fog of the best quality, complete with particles of carbon, flying has been practically nil. The total flying time was 1 hr. 30 mins.

Messrs. J. Brinton and G. V. Perry made solo flights.

The Club will be closed down during the Christmas holidays, from December 23 to Wednesday, December 29.

The Newcastle-upon-Tyne Aero Club.

Report for week ending December 5 :—Total flying time, 6 hrs. 15 mins. ; dual, 6 hrs. ; test, 15 mins.

The following members flew under instruction :—Messrs. Turnbull, Wilson, Rammussen, Stawart, Wardill, Shaw, and A. Bell. Dr. Dixon flew with Mr. Parkinson for advanced dual instruction.

Report for week ending December 12 :—Total flying time, 13 hrs. 30 mins. ; dual, 9 hrs. 15 mins. ; solo, 3 hrs. 15 mins. ; passenger flights, 1 hr.

Members who flew with Mr. Parkinson under instruction :—Messrs. Stawart, Mathews, J. M. Kennedy, Irving, Wardill, Turnbull, Bruce, Bell.

The following members flew solo for practice :—Mr. Irving, Mr. Mathews.

Pilot members flew with passengers as under :—Dr. Dixon with Mrs. Watt and Mr. Catcheside, Mr. R. N. Thompson with Miss Willis, Mr. C. Thompson with Mrs. Heslop.

Mr. Parkinson took the following for joy rides :—Miss Ward, Miss Bayliss, Miss Tiley, Mr. Fry, and Mr. Hay.

Flying was only possible on three days during the week, strong winds prevailing almost all the week. Only one machine is on service at present.

On two days, when it was too windy for solo work or landings, Mr. Parkinson took Mr. Irving for instruction in short cross-country flights.

Report for week ending December 19.— Total time flown, 8 hrs. 40 mins. Dual 4 hrs. 25 mins., solo, 4 hrs. 5 mins., passenger 10 mins.

The following members flew under instruction : Messrs. M. Kennedy, A. Bell, R. Stawart, Turnbull, H. Ellis, Miesegaes.

Mr. J. D. Irving and Mr. D. Mathews flew solo during the week.

The following members flew with passengers. Mr. R. N. Thompson with Mr. Percy, Mr. C. Thompson with Mrs. Heslop, Dr. H. L. B. Bixon with Mr. F. H. Phillips, and Mr. R. N. Thompson with Mr. and Mrs. Willis.

Mr. Irving successfully passed the tests for his aviator's certificate on Saturday, in spite of a very strong and gusty wind.

Flying was possible only on Monday, Saturday and Sunday, owing to gales on the remaining days of the week.

On Friday, Mr. Ellis with Mr. Heppell as passenger brought up a new Renault Avro from Witney to Sherburn, completing the journey to Cramlington on Saturday. Unfortunately the Renault developed trouble during the last mile of the journey and it could not be put on service on Sunday.

G-EBLX (Moth), the only machine on service for training at present, had engine trouble on Sunday morning, a broken piston causing Mr. Parkinson to execute a very difficult forced landing while flying with Mr. Kennedy, who was under instruction at the time. The engine cut out just after leaving the aerodrome and it was only through Mr. Parkinson's skill that the machine was undamaged. The Moth and the Avro should be both on service for the holiday.

The Aerodrome will be closed down on Christmas and New Year's Day only ; flying will be as usual on other days.

The Yorkshire Aeroplane Club

Report for the week ending December 17.—The total time flown this week was only 2 hrs. 55 mins., arrived at as follows :—Solo : 1 hr. 55 mins. dual, 40 mins. ; test, 10 mins., and a joy ride given by Mr. Carter, 10 mins.

Messrs. Dawson, Mann, Watson and Wood flew solo, and Mr. Lax and Miss Woodhead received dual instruction.

On Saturday, the 11th, the first Aerial Commercial Traveller made his appearance at the Aerodrome when Messrs. C. P. B. Ogilvie and J. P. C. Phillipps took us by storm in their Avro G-EBSS. They had set out from Birmingham a few days previously and had since been touring the country, calling at the principal towns en route for the purpose of taking orders for the Tellus "Super" Vacuum Cleaner, a sample of which was carried in the machine.

Mr. Phillipps informed us that one of the other Clubs had been extravagant enough to purchase one for cleaning out the interior of their "Moths," but in spite of all the merits he claimed for this elaborate apparatus we refused to take the bait by following their example. Perhaps if he would arrange to call next time with a cheap line in "Super" rat traps we would consider giving him an order for some. It would certainly be a case of money well spent, some bags of flour used in the Bomb-dropping Competition at our last pageant having been partially consumed by these pests during a recent week-end !

After four days' stay, the travellers left us for Manston in Kent, calling at Leeds on their way to complete some business.

Our next visitor was an S.E.5 (G-EBPD) piloted by a Mr. Atcherley, who had flown over from York on the Monday. He had intended leaving again the same afternoon, but on account of the fog was obliged to wait until the next morning.

On Friday another Avro landed here, Mr. Baxter Ellis of the Newcastle Club, with Mr. Heppell, their Chairman, having come from Witney, Oxon. The machine, which was fitted with a Renault engine, had been bought from the Berkshire Aviation Company for the Club's use.

AIRISMS FROM THE FOUR WINDS

Helvellyn *v.* Aeroplane

THE attempt to land on Mt. Helvellyn in an aeroplane, to which reference has already been made in FLIGHT, by the energetic chairman of the Lancashire Aeroplane Club, Mr. John Leeming, has, *pro tem.*, failed. Mr. Leeming set out from Woodford, flying a new Avro "Gosport," fitted with an Avro "Alpha" engine, on December 15, in company with Bert Hinkler, the Avro test pilot, in another machine carrying a press photographer. At the time of the start weather conditions were ideal, but they had not been in the air long before the weather changed completely. Clouds began to form in the sky, and ground fog made landmarks difficult to pick up. At Preston they ran into a severe hailstorm, and after a short stop at Lancaster crossed Morecambe Bay, striking heavy patches of sea fog, which could only be avoided by flying at 6,000 ft. Near Lake Windermere the two machines got separated in the clouds and mist, but eventually came together again, when conditions being so bad, it was decided to abandon the attempt and turn back. Steering mainly by compass, and encountering several hailstorms, they managed to return safely to Woodford in the gathering darkness, and landed there in a snowstorm. Mr. Leeming states that he will make another attempt.

German Air Liner's Forced Descent

ONE of the German Junkers three-engined air liners on the Amsterdam-Croydon route was forced to descend near Folkestone on December 15. One of the engines developed water trouble when over the Channel, and was therefore switched off. Shortly after, however, a second engine developed trouble, and so the pilot had to land. This was accomplished safely and the passengers proceeded to London by train.

"Moths'" Eastern Tour

CAPT. T. N. STACK and Mr. B. S. Leete, of the Lancashire Aero Club, have arrived safely at Baghdad, after a splendid flight in their D.H. "Moths" over some 860 miles of the Syrian desert, during which they encountered head winds, rain and sand storms. They left Cairo on December 14 and made their first halt at Amman, proceeding the next day to Ratbah Wells, thence on December 16 to Baghdad. They expect to stay at Baghdad for several days before starting on the difficult route along the Persian Gulf, and during this stay R.A.F. mechanics will overhaul the "Moths" whilst their owners will be entertained by their old R.A.F. Squadrons Nos. 45 and 70.

The French Madagascar Flights

LIEUT. BERNARD, who started from Madagascar on December 11 on the return flight to France, reached Mwanza, the southern extremity of Lake Victoria, Nyanza on December 15. Commandant Dagnaux, the third French pilot who is on his way out to Madagascar from France (he left Le Bourget in a Breguet XIX A.2-Renault on November 28), arrived at Fort Lamy (near Lake Chad) on December 16.

The Spanish African Flight

THE three Dornier-Wal flying boats of the Spanish Atlantic Squadron, under the command of Maj. R. Llorente, completed the third stage of the flight from Melilla to Fernando Po (W. Africa) on December 18, when they arrived at Port Etienne from Las Palmas. One of the machines had to make a temporary landing at Rio de Oro in order to carry out an adjustment.

The Swiss African Flight

LIEUT. MITTELHOLZER, who is engaged in an aerial scientific expedition to Africa, arrived in the Dornier "Mercury" seaplane at Cairo on December 17, and landed on the Nile.

A "Spare-Part" Non-Rigid Airship

THE U.S. naval air station at Lakehurst recently assembled a non-rigid airship—known as the J-3—for training and experimental purposes, utilising for its construction parts from various sources. The car and engines for the new airship were purchased from the Army Air Corps, the envelope from the Goodyear Tyre and Rubber Co., of Akron, and the control surfaces were made at the Naval Aircraft Factory, Philadelphia. The J-3 has two Wright I-type engines and a gas capacity of 220,000 cub. ft.; its cruising radius is about 1,000 miles. It made a successful test flight, and subsequent cross-country trips, under the command of Lieut. Clinton H. Havill, U.S.N., and now occupies a berth in the Lakehurst hangar alongside the "Los Angeles."

Mr. Phillips Crashes

MR. J. C. P. PHILLIPS, who, as recorded in a recent issue of FLIGHT, was carrying out an organised canvass in connection with a certain make of vacuum cleaner by way of the air, met with a mishap when flying from Leeds to Manchester. On approaching Manchester he encountered a strong gusty wind and was blown off his course towards Blackburn. It was whilst landing at Ripley—three attempts had to be made—that Mr. Phillips crashed. The machine was wrecked and Capt. Ogilvey, who was his passenger, was rendered unconscious, while Mr. Phillips received injuries to his face.

Big Air Concentration at U.S. Army-Navy Manœuvres

WHAT is claimed to be the greatest concentration of aerial fighting forces ever held in America will take place on the occasion of the joint Army and Navy Manœuvres at Narragansett Bay area, which start next May. Over 40 aircraft will accompany the Battle Fleet when it leaves its bases on the Pacific, added to which will be the squadrons from the Scouting Fleet and a formidable array of Army aircraft.

Air Police for Mexico

IT is reported that the Mexican Director-General of Customs is presenting to the Secretary of the Interior plans for the acquisition of three aeroplanes equipped with machine guns and bombing apparatus for the purpose of establishing an air patrol to detect smuggling along the Mexico-U.S.A. border.

A Peruvian Air Service

PLANS are being prepared for a seaplane service on the Upper Amazon between Iquitos and Central Peru. This service, which will function under the general supervision of the Ministry of Marine, will be employed to map the Upper Amazon territory, as well as to carry passengers and mail. At present, the overland trip to and from Iquitos takes from 20—30 days, but by air it will occupy only 2 or 3 days.

A New Czecho-Slovak Air Transport Company

A NEW air transport company, with a capital of about £50,000, has been formed at Prague for the purpose of operating international air lines, the first of which will be between Toplitz and Trieste, via Prague, Brunn, Bratislava, and Zagreb.

Fog Hampers Cross-Channel Air Services

Two weeks ago thick fog—stated to be the worst within memory—hung over Paris, with the result that it was practically impossible to continue the Continental air services to and from Le Bourget. No machines left Le Bourget on December 9 and 10, whilst one British and one French machine from Croydon, on December 9, had to land at Beauvais, the passengers—one being Sir Sefton Brancker—having to proceed to Paris by rail. A third machine from Croydon got to Le Bourget, but was unable to land and had to return to Beauvais. These conditions, however, did not prevail at Croydon, otherwise there would have been an opportunity of testing the new fog-landing arrangements that have just been installed there. These, by the way, consist of a system of directional wireless signals in conjunction with a 20 ft. Neon tube, which indicates the best position and direction for landing. Neon lights, it may be pointed out, possess remarkable fog-penetrating qualities.

An Italian Parachute

AN Italian parachute, the "Salvator," which is used in the Royal Italian Air Force, was demonstrated by its inventor, Lieut. Freri, at Stag Lane Aerodrome, on December 4 before Air Ministry experts. Lieut. Freri ascended in a D.H. machine, and when at an altitude of 1,000 ft., made his jump. The parachute—which is carried in a neat pack on the back, and weighs only 14 lb.—opened smoothly and quickly, but owing to the wind being stronger than anticipated, some vigorous "swimming" actions on the part of Lieut. Freri were necessary in order to prevent the parachute from drifting into the hangars. However, a successful landing was accomplished.

Referring to his Australia and Back Flight in a De Havilland 50 J machine, fitted with SHORT Floats, Sir Alan Cobham said :—

"The SHORT

ALL-METAL FLOATS

were perfect in design, inasmuch as we were able to get off the water on all occasions with as much as 1,000 lbs. overload, on a machine whose maximum permissible load was about 4,000 lbs. They remained watertight throughout."

In a message to "Flight."

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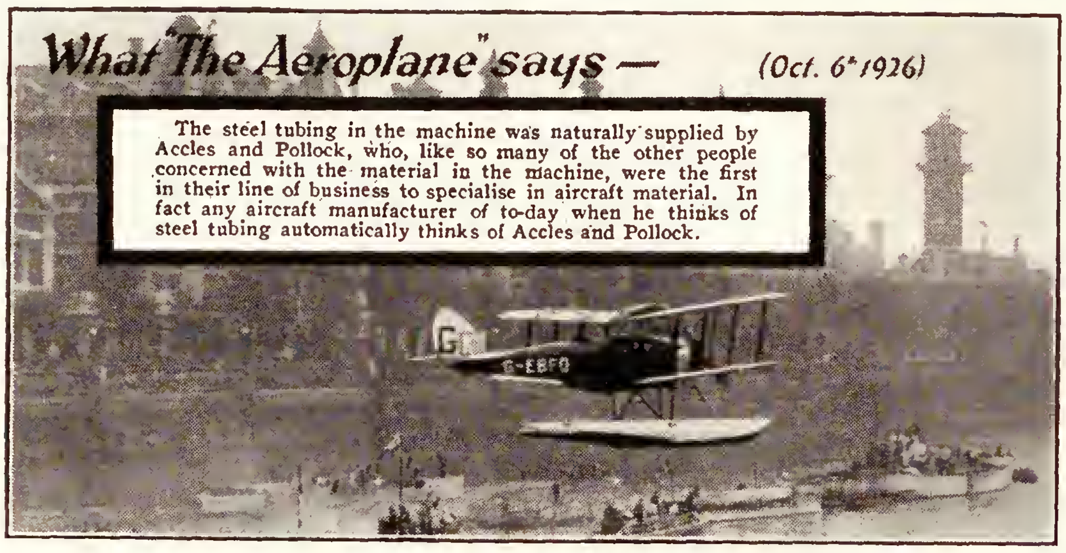

What "The Aeroplane" says — (Oct. 6th 1926)

The steel tubing in the machine was naturally supplied by Accles and Pollock, who, like so many of the other people concerned with the material in the machine, were the first in their line of business to specialise in aircraft material. In fact any aircraft manufacturer of to-day when he thinks of steel tubing automatically thinks of Accles and Pollock.

In the De Havilland machine used by **SIR ALAN COBHAM** in his recent and famous London-Melbourne-London Flight, all the tubing and tubular parts were of our manufacture.
What better demonstration of their suitability for important aircraft construction ?

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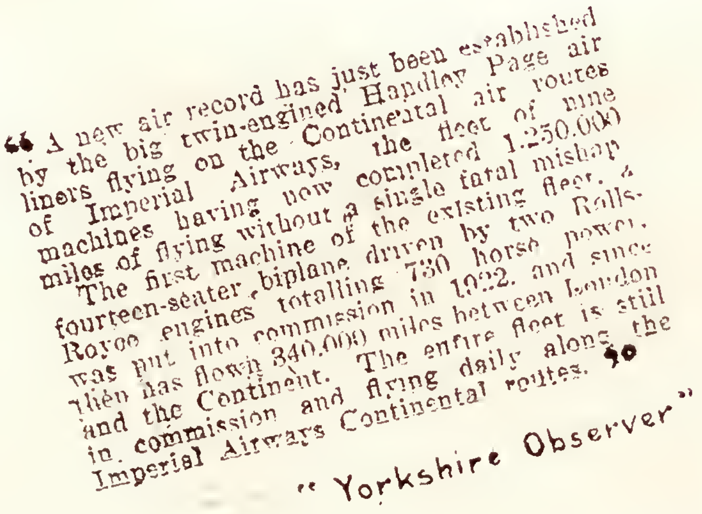

"A new air record has just been established by the big twin-engined Handley Page air liners flying on the Continental air routes of Imperial Airways, the fleet of nine machines having now completed 1,250,000 miles of flying without a single fatal mishap.
The first machine of the existing fleet, a fourteen-seater biplane driven by two Rolls-Royce engines totalling 730 horse power, was put into commission in 1922, and since then has flown 340,000 miles between London and the Continent. The entire fleet is still in commission and flying daily along the Imperial Airways Continental routes."

"Yorkshire Observer"

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THE ROYAL AIR FORCE

London Gazette, December 14, 1926

General Duties Branch

J. F. Griffiths is granted a short service commn. as Pilot Officer on probation, with effect from and with seny. Dec. 3; Pilot Officer on probation B. B. Dowling (Lieut., Manch. R., R.A.R.O.) is confirmed in rank; Nov. 23. Pilot Officer R. N. T. Gape is promoted to rank of Flying Officer; June 1 (since deceased) (substituted for *Gazette*, Aug. 17).

The following are transferred to Reserve:—

Class A.—Flight-Lieuts. M. Burbidge, A. E. Reynolds; Dec. 12. E. H. Attwood; Dec. 13. Flying Officers L. W. Beck, D. E. Hall, G. F. Mackay; Dec. 12. B. A. Davy; Dec. 13.

Class B.—Flight-Lieut. C. A. Elliott; Dec. 12. Flying Officer H. A. Dinnage; Dec. 12.

Class C.—Flight-Lieut. G. H. Allison; Dec. 12. Flying Officers C. H. F. Nesbit; Dec. 12. W. J. Brown; Dec. 13.

Flying Officer A. O. Pollard, V.C., M.C., D.C.M. (Capt., T.A. Reserve), resigns his short service commn.; Dec. 15. Flying Officer M. Kortright (Lieut., Suffolk Regt.), relinquishes his temp. commn. on return to Army duty; Nov. 20.

Stores Branch

Flight-Lieut. H. V. Robbins (Lieut., The Border Regt.) is granted a permanent commn. in this rank on completion of probationary service; Aug. 1, 1925.

Medical Branch

Flight-Lieut. (Hon. Sqdn.-Ldr.) W. R. Reith, M.D., A.M., relinquishes his temp. commn. on account of ill-health; Dec. 10.

Chaplains Branch

The Rev. R. E. V. Hanson, O.B.E., M.A., is granted the relative rank of Air Commodore on appointment as Chaplain-in-Chief, R.A.F.; Oct. 25.

Reserve of Air Force Officers

The following Pilot Officers are promoted to rank of Flying Officer:—D. P. Jones; Oct. 27. A. C. Robertson; Nov. 5. F. M. Brownlee; Nov. 21. E. J. Dilnutt; Dec. 2.

The following Flying Officers relinquish their commns. on completion of service:—W. H. Herd; Oct. 23. G. A. Gowler; Dec. 8. R. C. Rodger, M.C., D.C.M.; Dec. 9. C. G. Boothroyd, D.F.C.; Dec. 12.

Gazette Nov. 30 concerning Flight-Lieut. A. Roberts is cancelled, and *Gazette* Nov. 23 stands.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders: E. H. Johnston, O.B.E., D.F.C., to R.A.F. Depot. Uxbridge, Supernumerary, pending posting on transfer to Home Estabt., 25.11.26. B. L. Huskisson, D.S.C., to No. 10 Group H.Q., Lee-on-Solent; for Air Staff duties; 20.12.26. R. M. Hill, M.C., A.F.C., to H.Q., Egypt, for Technical Staff duties; 30.11.26. D. S. K. Crosbie, O.B.E., to R.A.F. Depot, Uxbridge, Supernumerary, pending posting on transfer to Home Estabt.; 20.11.26.

Squadron Leaders: A. Conningham, D.S.O., M.C., D.F.C., A.F.C., to R.A.F. Cadet Coll., Cranwell; 20.12.26. T. Q. Studd, D.F.C., to No. 4 Flying Training Sch., Egypt; 29.11.26.

Flight Lieutenants: W. A. Harvey, to R.A.F. Station, Upavon; 14.12.26. W. H. Poole, A.F.C., M.M., to No. 1 Flying Training Sch., Netheravon; 20.12.26. P. M. McSwiny, to Armament and Gunnery Sch., Eastchurch; 10.1.27. W. R. Castings, M.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt.; 4.1.27. W. R. Castings, M.B.E., to Air Ministry, Directorate of Personal Services; 10.1.27. C. H. Cahill, to Marine Aircraft Experimental Estabt., Felixstowe; 4.1.27. S. T. Freeman, M.B.E., to Marine Aircraft Experimental Estabt., Felixstowe; 8.12.26. P. Murgatroyd, to Heliopolis Details, Egypt; 29.11.26.

Flying Officers: J. E. G.-H. Thomas, to R.A.F. Base, Gosport; 9.12.26. N. T. Goodwin, to R.A.F. Depot, Uxbridge, on transfer to Home Estabt.; 17.11.26. R. A. A. Cole, to Aden Flight; 24.11.26. F. G. Jennings, to Central Flying Sch., Wittering; 21.12.26.

Pilot Officers: B. B. Dowling, B. E. Moody, and W. J. Pickard, to No. 2 Sqdn., Manston; 14.12.26. H. D. Gunton and R. H. Donkin, to No. 13 Sqdn., Andover; 14.12.26. J. A. Tindall and V. G. A. Hatcher, to No. 7 Sqdn., Bircham Newton; 14.12.26. E. D. MacL. Hopkins, C. P. Ashton-Jinks, W. M. Phillips, and G. A. Underwood, to No. 4 Sqdn., S. Farnborough. 14.12.26. F. Gower-Jones and A. F. Merritt, to No. 12 Sqdn., Andover, 14.12.26. C. S. John, to No. 58 Sqdn., Worthy Down; 14.12.26. H. C. Johnson, to No. 99 Sqdn., Bircham Newton; 14.12.26. D. Mackenzie, to No. 207 Sqdn., Eastchurch; 14.12.26. E. G. Searson, to No. 16 Sqdn., Old Sarum; 14.12.26. H. J. Walker, to No. 39 Sqdn., Spittlegate; 14.12.26.

Stores Branch

Flying Officers: L. N. Sargent, to No. 5 Armoured Car Co., Iraq; 1.11.26 R. Q. Bamber, to No. 14 Sqdn., Palestine, instead of to H.Q., Transjordan and Palestine, as previously notified; 1.10.26.

Pilot Officer H. M. S. Dawes, to No. 24 Sqdn., Kenley; 17.12.26.

Accountant Branch

Flying Officers: R. E. Barrett, to No. 2 Sqdn., Manston; 13.12.26. R. C. Clayton, to No. 14 Sqdn., Palestine; 1.10.26. H. A. Murton, to Stores Depot, Iraq; 1.11.26.

Pilot Officers: C. L. Dook, to No. 3 Stores Depot, Milton; 16.12.26. W. S. Calder, R. S. Sweet, H. D. Connor, H. C. Bakes, J. E. Gregson, B. Chadwell, D. A. K. Yiend, J. H. Glenn, and C. M. Johnson, to H.Q., Cranwell, on appointment to permanent commns. (on probation); 4.12.26.

Medical Branch

Flight Lieutenant A. Dickson, M.B., to No. 20 Sqdn., India; 26.10.26.

Flying Officers: R. A. W. Kerr, M.B., and E. Thompson, to R.A.F. Hospital, Halton; 10.12.26.

Squadron Leaders: R. E. Bell, M.B., to No. 23 Group H.Q., Grantham, 6.1.27. T. C. St. C. Morton, M.D., D.T.M., and H., to R.A.F. Depot, Uxbridge; 2.1.27.

Flight Lieutenants:—G. H H. Maxwell, M.B., to Elec. and Wireless Sch., Flowerdown; 18.1.27. E. C. K. H. Foreman, to H.Q. Halton; 20.1.27. P. McCullagh, M.B., to R.A.F. Station, Tangmere 17.1.27.

Chaplains Branch

Rev. A. McHardy, M.C., M.A., to No. 2 Flying Training Sch., Digby, on transfer to Home Estabt.; 6.1.27.

NAVAL APPOINTMENTS

THE following appointments were made by the Admiralty on December 15:

Lieutenants: D. A. C. Sillar, R. F. C. Struben, S. B. de Courcy-Ireland, W. W. P. Shirley-Rollison, R. T. C. Woods, and J. D. Elliott, to *Furious* and as Acting Observer; H. B. Hilbeck, to *Furious*, addl., and as Acting Observer; Nov. 22. J. V. Findlay, J. D. Dale, and K. W. Beard, to *Furious*, addl., and as Acting Observer; Nov. 22. And to *Argus* and as Acting Observer (on commg.). L. H. Phillips, to *Royal Oak*; Jan. 1., and H. St. A. Malleson, to *Marlborough*; Jan. 3.

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IN PARLIAMENT

Cooke-Schilovsky Turn Indicator

Colonel Day, on December 15, asked the Secretary of State for Air the results of the tests of the gyroscopic fog-guide device; and whether any of these instruments have been ordered by the Ministry?

Sir Samuel Hoare: The Cooke-Schilovsky Turn Indicator, recently referred to in the Press, has undergone satisfactory tests, and arrangements are being made to order a number for extended service trials and for training purposes.

Flying Accidents

Colonel Day asked the number of officers and men of the Royal Air Force killed in flying accidents during each of the three years preceding the last convenient date, together with the number of fatal accidents in the French Air Force during the same period?

Sir S. Hoare: The figures as regards the Royal Air Force during the 12 months ending December 9 in each of the years named were as follows:—1926: 46 officers, 2 cadets, 28 airmen; 1925: 40 officers and 11 airmen; 1924: 48 officers, 1 cadet and 23 airmen. In addition the following naval, military or civilian personnel were involved in fatal accidents to Royal Air Force machines:—In 1926, 7; 1925, 4; 1924, 2. As regards the French Air Force, according to my information statistics of the number of fatal accidents are not made public by the French authorities. I may say, however, that in the course of a debate in the Chamber at the end of November, it was stated that there had been 13 fatal accidents in the French Military Air Service on a single type of machine in the space of two months. Whilst this, no doubt, represents an exceptional period such as all air services must experience from time to time, it is apparent from this fact and other confidential information in my possession that figures which have recently been cited in this House purporting to suggest that the accident rate in France has, during the past two or three years, been more favourable than in this country, are totally inaccurate.

Colonel Gretton asked the Prime Minister if an independent inquiry, with a chairman not connected with the Air Force, will be set up immediately with full powers to investigate and report upon all the circumstances connected with flying accidents, both fatal and non-fatal, which have occurred recently in the Royal Air Force?

Mr. Baldwin: No, sir. As I informed the House last Thursday, I am satisfied that every possible precaution is being taken and an inquiry of the kind proposed would, in my view, serve no useful purpose.

R.A.F. Machines

Mr. Hammersley asked the Secretary of State for Air what proportion of the flying machines in use are of pre-1917 design?

Sir S. Hoare: Out of a total of 22 types of machine (excluding experimental machines) in use by the Royal Air Force to-day, there are only two which were designed prior to 1917—one a service and one a training type. The number of machines of these types at the present time represents, approximately, 36 per cent. of the total number of machines.

Italian Parachute

Colonel Day asked the result of the tests of the new type of self-propelled parachute, by Lieut. Freri, of the Italian Air Force, at Stag Lane Aerodrome?

Sir S. Hoare: The trials of the new Italian parachute at Stag Lane were a private demonstration, in the course of which a successful descent was made from 1,200 ft. by Lieut. Freri. Representatives of the Air Ministry attended by invitation, and the result of the test was considered to be sufficiently satisfactory to warrant further experiments.

Weather Forecasting

Captain Garro-Jones asked the Secretary of State for Air whether he can report any progress in regard to the theories of weather on which the Norwegian meteorologist has been working in the Air Ministry during the past year?

Sir S. Hoare: Yes, sir; I am glad to say that the visit of the meteorologist in question, Dr. J. Bjerknes of Bergen, has had most satisfactory results. He came to London at the invitation of the Air Ministry in October, 1925, and remained until last March. During the time daily conferences took place between him and members of the Meteorological Office, and at these meetings certain new principles introduced into weather forecasting by Norwegian meteorologists, as the result of recent research on the structure of the atmosphere, were demonstrated and discussed. The new ideas have proved of practical value, especially in forecasting the rapid weather changes which are of vital importance to aviation.

THE ROYAL AIR FORCE MEMORIAL FUND

THE last meeting of the Executive Committee of the Fund for 1926 was held on December 15, at Iddesleigh House, Lord Hugh Cecil, P.C., M.P., in the chair.

The Honorary Treasurer announced that two very munificent donations had been made to the Committee by the Air Council—one in respect to the profits of the Royal Air Force Display at Hendon in July last, and the other donation being the Royal Air Force share of the Royal Tournament profits at Olympia in May and June last. Upon the proposition of Air Vice-Marshal Sir John Salmond a resolution of warm thanks to the Air Council for their generosity to the Fund was carried unanimously.

The resignations of Air Vice-Marshal Sir Geoffrey Salmond and Air Vice-Marshal T. I. Webb-Bowen of their membership of the Committee were submitted by those officers, on their proceeding, in the case of Sir Geoffrey Salmond, to take over the Command of the Royal Air Force in India, and in the case of Air Vice-Marshal T. I. Webb-Bowen, on that officer proceeding to take over command of the Royal Air Force in the Middle East at Cairo.

It was announced that acting on behalf of Air Chief Marshal Sir Hugh Trenchard (who was unable to be present), Air Vice-Marshal Sir Philip Game, Air Member for Personnel, Air Ministry, had laid a wreath, provided by the Fund, on behalf of the Royal Air Force at the foot of the R.A.F. War Memorial on the Victoria Embankment on Armistice Day.

The Committee were informed that a letter had been received from Sir Robert Lorimer, Architect of the Scottish National War Memorial, Edinburgh, to the effect that the Royal Air Force Bay of that Memorial, the funds for the erection of which were provided by this Committee, was almost completed, and that it is hoped the complete War Memorial would be ready for unveiling in the early summer of next year.

Next meeting of the Executive Committee will take place at the offices of the Fund, February 16, at 3 p.m.

The usual meeting of the Grants Sub-Committee of the above Fund was held at Iddesleigh House, on December 16.

Mr. W. S. Field was in the chair, and the other members of the Committee present were :—Mrs. L. M. K. Pratt-Barlow, O.B.E. ; Squadron Leader Douglas Iron, O.B.E.

The Committee considered in all 14 cases, and made grants to the amount of £120 2*s*. 6*d*..

Next meeting, January 6, at 2.30 p.m.

⁂

At Buckingham Palace

H.M. THE KING received at Buckingham Palace, on Dec. 20, the Hon. Sir Samuel Hoare, Air Minister, and Air Vice-Marshal Sir John F. A. Higgins, whom His Majesty invested with the order of K.B.E.

Award of F.A.I. Medal to Sir Alan J. Cobham

AT the Conference of the Federation Aeronautique Internationale, held in Paris on December 16-17, the F.A.I. Gold Medal for the year 1926 was awarded to Sir Alan J. Cobham for his flight from England to Australia and back. Thirteen countries were represented at the Conference, six of which put in claims for the F.A.I. Gold Medal in connection with performances carried out by their respective countrymen. Great Britain was represented by Lieut.-Col. M. O'Gorman and H. E. Perrin.

R.A.F. Accountant Officers

THE Air Ministry announces that the following candidates for permanent commissions in the Accountant branch of the Royal Air Force have been declared successful as a result of a competition held by the Civil Service Commissioners in September, 1926 :—

W. S. Calder, Kirkintilloch ; F. E. Fuller, Worthing ; R. S. Sweet, Hanwell ; H. D. Connor, Ilford ; H. C. Bakes, Bradford ; J. E. Gregson, New Malden ; B. Chadwell, Blackburn ; D. A. K. Yiend, Forest Gate ; J. H. Glenn, Manchester ; and C. M. Johnson, Winchester.

A New Air Force Trophy

LORD ESHER has presented a handsome bronze trophy on an ebony pedestal to be awarded annually to the squadron of the Auxiliary Air Force judged to be the best all-round squadron of the year. The winning squadron for this year is No. 601, County of London Bombing Squadron, commanded by Lord Edward Grosvenor, and that squadron, therefore, becomes the first holder. The trophy will be presented at a later date during a parade of the squadron.

IMPORTS AND EXPORTS, 1925-1926

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912 ; for 1912 and 1913. see "FLIGHT" for January 17, 1914 ; for 1914, see "FLIGHT" for January 15, 1915 ; for 1915, see "FLIGHT" for January 13, 1916 ; for 1916, see "FLIGHT" for January 11, 1917 ; for 1917, see "FLIGHT" for January 24, 1918 ; for 1918, see "FLIGHT" for January 16, 1919 ; for 1919, see "FLIGHT" for January 22, 1920 ; for 1920, see "FLIGHT" for January 13, 1921 ; for 1921, see "FLIGHT" for January 19, 1922 ; for 1922 see "FLIGHT" for January 18, 1923 ; for 1923, see "FLIGHT" for January 17, 1924 ; for 1924, see "FLIGHT" for January 22, 1925 ; for 1925, see "FLIGHT" for January 21, 1926.

	Imports.		Exports.		Re-Exports.	
	1925.	1926.	1925.	1926.	1925.	1926.
	£	£	£	£	£	£
Jan. ..	3,546	494	83,728	130,049	291	—
Feb. ..	985	2,089	85,639	40,416	20	6,341
Mar. ..	—	1,001	56,881	92,840	9,355	9,758
Apl. ..	321	536	78,041	160,832	6,732	5,051
May ..	560	342	74,844	118,539	15,278	—
June ..	190	24,866	71,009	6[illegible],111	667	150
July ..	184	16,033	159,262	39,047	870	—
Aug. ..	469	21,401	113,054	146,129	—	1,035
Sept. ..	1224	3,172	111,237	55,674	213	—
Oct. ..	460	528	114,563	41,968	855	30
Nov. ..	837	1,069	84,163	118,648	2,314	250
	8,776	71,531	1,032,421	1,010,253	36,595	22,615

⁂

PUBLICATIONS RECEIVED

The Approach Towards a System of Imperial Air Communications : Memorandum by the Secretary of State for Air, laid before the Imperial Conference, 1926. *H.M. Stationery Office, Kingsway, London, W.C.2. Price* 5*s. net.*

Whitaker's Almanack, 1927 : *Abridged Edition.* J. Whitaker and Sons, Limited, 12, Warwick-lane, London, E.C.4. Price 1*s*. 6*d*. net.

Whitaker, 1927. *Complete Edition.* J. Whitaker and Sons, Limited, 12, Warwick-lane, London, E.C.4. Price 6*s*. net.

Notes on Distance Thermometers. By Negretti and Zambra, 38, Holborn Viaduct, London, E.C.1.

Monthly Journal of the British Empire Chamber of Commerce in the United States of America. No. 11. *Vol.* 6. *November*, 1926. 25, Broadway, New York, U.S.A.

⁂

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations : Cyl. = cylinder ; i.c. = internal combustion ; m. = motor.

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1925

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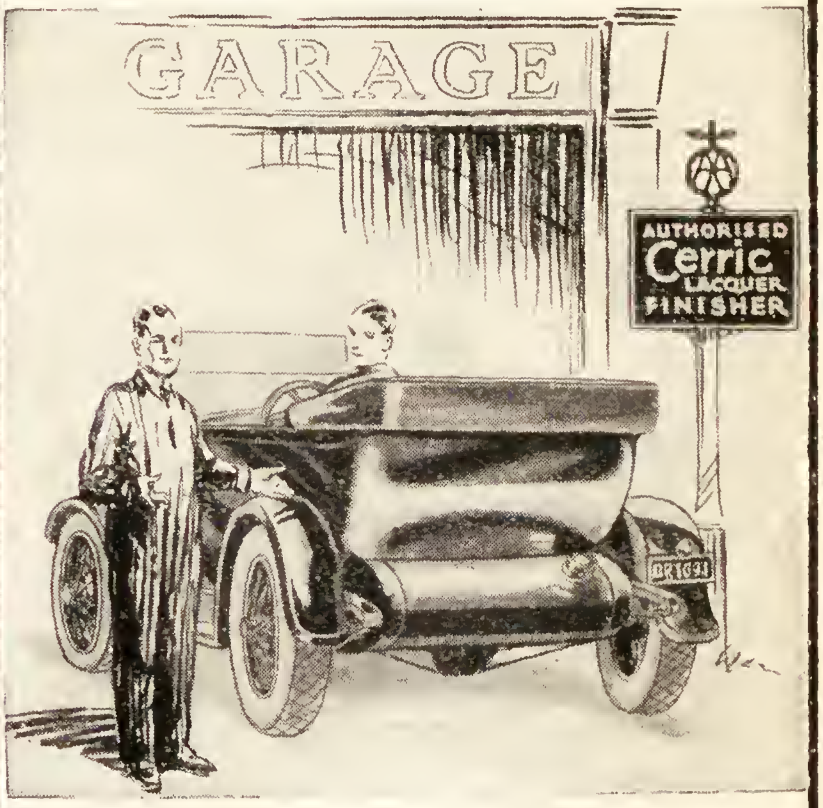

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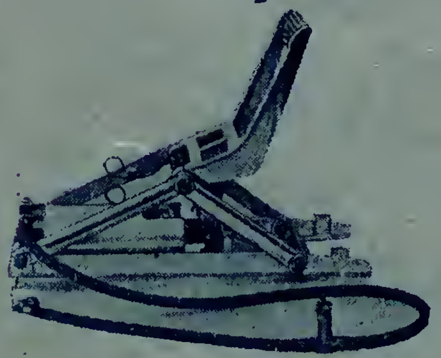

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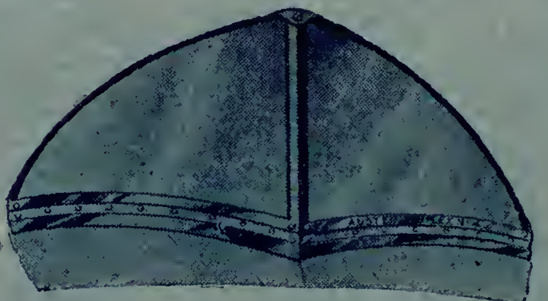

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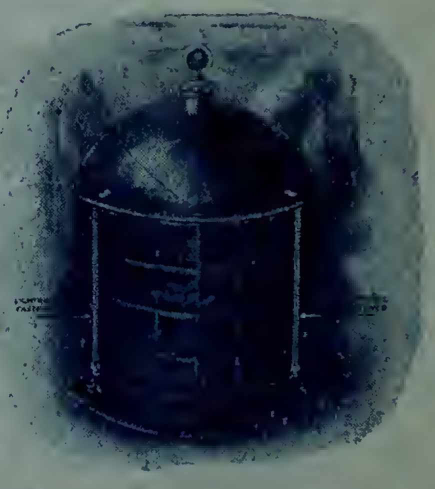

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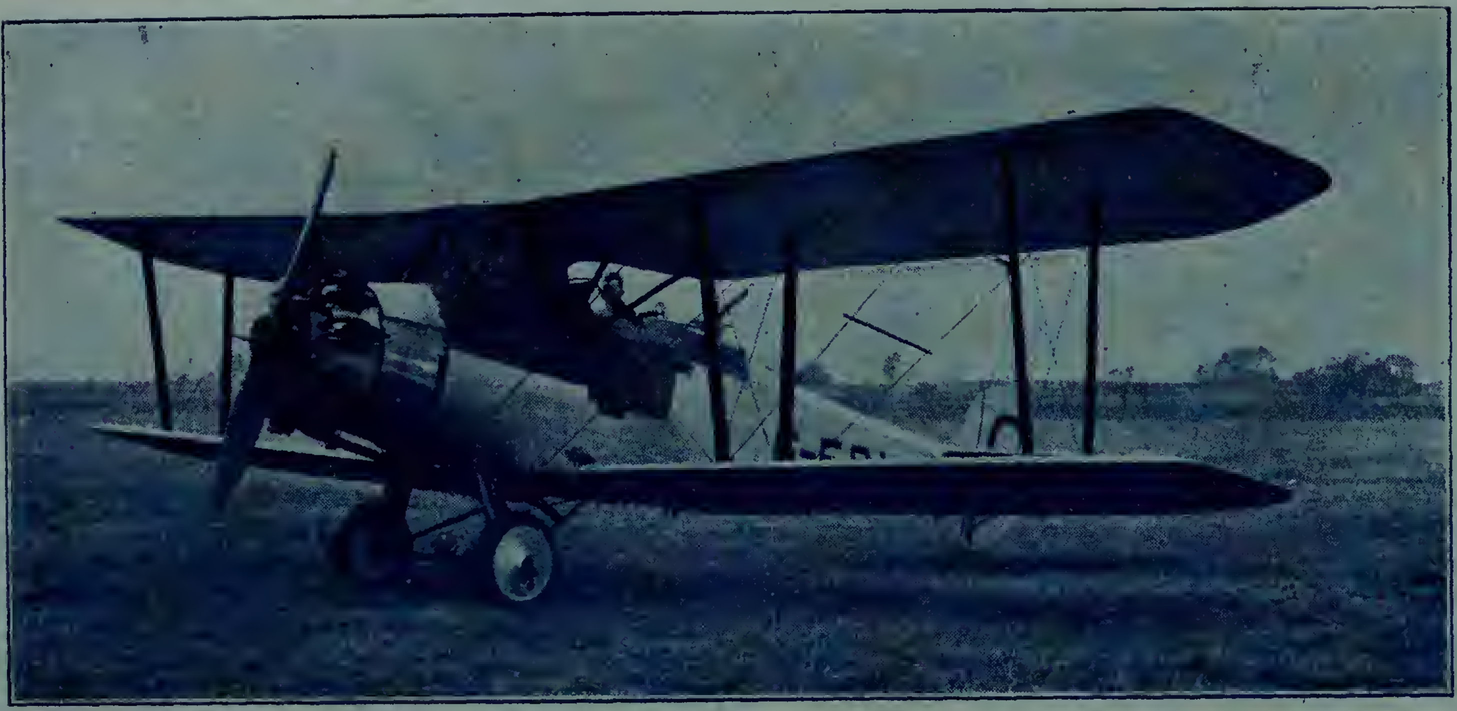

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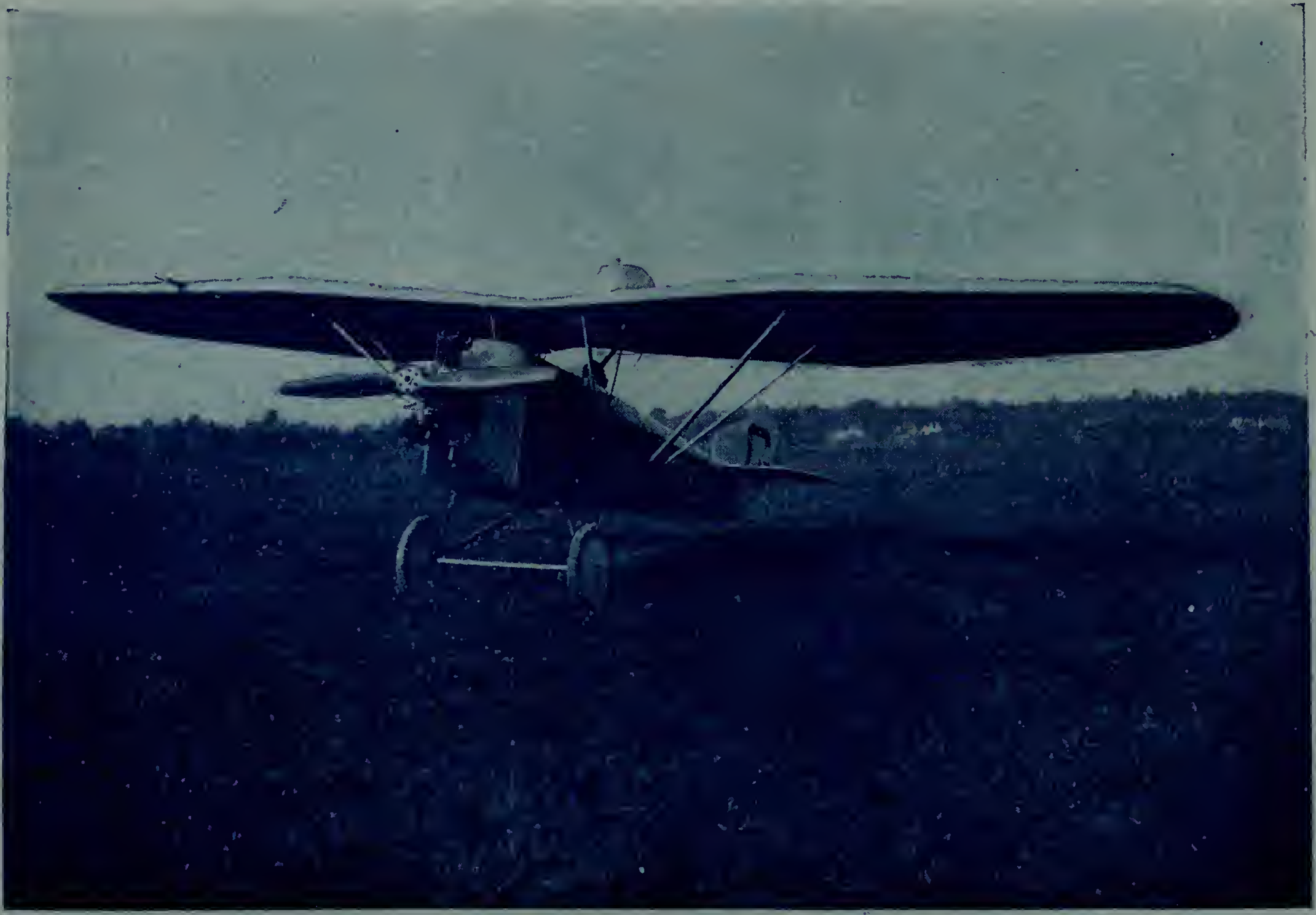

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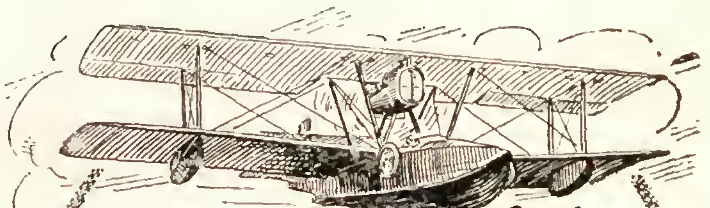

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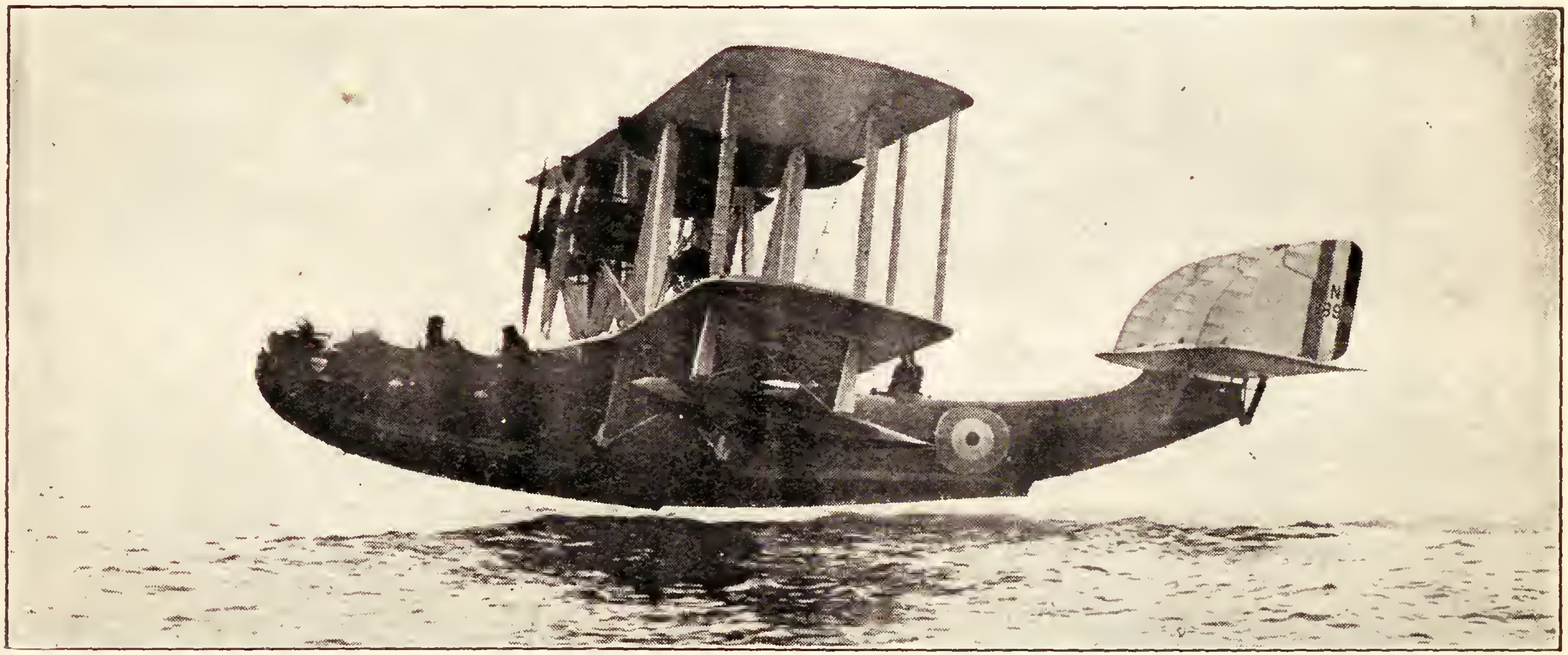

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1927

Jan. 6 .... **Major B. C. Carter, A.R.C.Sc. D.I.C., A.F.R.Ae.S. "Dynamic Forces in Aircraft Engines," before R.Ae.S.**

Jan. 13 .... **Professor F. C. Lea, D.Sc., M.Inst.C.E., M.I.Mech.E. "Some Experiments on the Effects of Repeated Stresses on Materials," before Inst.Ae.E.**

Jan. 20 .... **H. Glauert, M.A., F.R.Ae.S. "The Theory of the Autogiro," before R.Ae.S.**

Feb. 10 .... **Mr. H. P. Folland, F.R.Ae.S., M.B.E. (Honours Member). Paper, to be announced later, before Inst.Ae.E.**

EDITORIAL COMMENT.

Progress of Commercial Aviation

"If we look back over the 23 years of flight—indeed, if we only look back as far as the last Imperial Conference in 1923, we must be struck by the speed and the extent of the progress that has already been made. You will see in the comprehensive memorandum entitled 'The approach towards a system of Imperial Air Communications' that I have circulated, a picture of civil air transport as it is to-day. You will note that wider and wider use is being made of it. Since the last conference the mileage covered by the regular air routes of the world has more than doubled. You will note the technical improvement that has been made with machines, engines, wireless and meteorology. Machines have become more powerful, more dependable, and, as I think the members of the Conference who made flights at Croydon will admit, more comfortable. As to safety, what better record could there be than the 5,000,000 miles flown by British services for four fatal accidents, and the million miles flown in Australia for a single fatal accident?"

At the end of the year, in the last issue of FLIGHT of 1926, this passage from the statement on Imperial Air Communications made to the Imperial Conference, 1926, by Sir Samuel Hoare, the Secretary of State for Air, and published in "The Approach towards a System of Imperial Air Communication," issued by H.M. Stationery Office, sums up very briefly the progress that has been made in civil aviation up to the present time. It also affords an opportunity for having one final look around, as it were, at the position of British civil aviation at the close of the year. Sir Samuel's statement that "since the last conference the mileage covered by the regular air routes of the world has more than doubled" is interesting, and augurs well for the future of commercial aviation. If, however, we examine the figures for British aviation, the picture is, unfortunately, less promising.

To quote from the memorandum a few statistics: In 1919 the mileage flown over the regular air routes of the world was 1,170,000. In 1925 this figure had increased to 12,480,000. In 1919 the number of letters carried by the French Latecoere air lines between Toulouse and Casablanca was 9,124. The corresponding figure for 1925 was 7,502,191. In the United States the number of miles flown during the four fiscal years 1918-22 was 2,635,433, while during the four fiscal years 1922-25 the number of miles had increased to 7,891,099. The number of passengers carried by all the cross-Channel services has been increasing at the rate of nearly 3,000 a year between 1920 and 1925, while the passenger traffic for the first six months of 1926 was 43 per cent. greater than that in the corresponding period of 1925.

All this is very gratifying, and is a definite proof, if such were needed, that civil aviation has come to stay, and has before it a future the immensity of which can at present only be guessed at. If, however, we come down to earth and look a little more closely into that part of the world's regular air lines which concerns ourselves most directly, the British air lines, the picture is not quite so rosy. For instance, if we refer to the figures relating to the cross-Channel services, it is found that in 1920, out of a total number of 10,731 passengers carried, the British services carried 5,256, or just under half. In 1922 British services carried 9,490, while foreign services carried only 2,869. For the year 1923 the figures were British, 11,947; foreign, 3,189. For 1924 the British figure had dropped to 10,456, while the foreign had increased to 7,402, and finally, last year (1925) the British lines carried 10,602, and foreign lines 10,119. Thus, while the British figure has remained stationary for three years, foreign figures have increased to a vast extent, and now practically equal ours. We do not wish to dwell unduly upon this fact, but it should not be lost sight of. It is in no carping spirit that we wish to refer to the way in which British civil air lines have lost ground, or at any rate, have failed to maintain their lead over foreign competition, but there is no useful purpose served in blinking the fact.

On the score of safety the British lines have cause for congratulation. To have flown five million miles in the course of seven years, with only four accidents involving the death of passengers is a record of which we may justly be proud. A chart given in Sir Samuel's memorandum shows that whereas in the period from 1919 to 1920 the number of miles flown per accident was only 168,000, it has risen to over one million miles during the period from 1919 to 1926. This is at any rate proof that the British policy of safeguarding passengers in every possible way is thoroughly sound, and is justification for the system in force of inspecting and overhauling machines.

Probably very closely bound up with this excellent safety is the question of insurance, and on this subject it is interesting to find in the memorandum the statement that whereas in the earlier days of civil aviation insurance premiums were as high as 30 per cent. or so per annum, they are now lower than for surface transport. Thus on the London-Paris service the insurance per £100 for goods sent by surface transport is 6*s.* 8*d.*, while by air the premium is only 2*s.* This is a most gratifying feature of modern air transport, and the memorandum points out that this difference in insurance rates has caused considerable quantities of gold to be exported by air from England, and that in 1925 over ten million pounds sterling of bullion and specie were carried by the cross-Channel services.

On the subject of reliability there is one very encouraging official admission in the memorandum. "The reliability of the services," the memorandum states, "is most easily expressed by the percentage of flights commenced which were completed without interruption, *although this basis admittedly gives a more favourable impression than is justified, since it disregards scheduled services not begun.*" For several years FLIGHT has hammered away at this very point, indicating that by refusing to fly in anything but perfect conditions it is relatively easy to maintain 100 per cent. reliability, although such a service would be of little practical value. We are extremely glad that at last we have an official admission that this point is conceded, and we may now hope for returns based upon number of flights completed to number of flights scheduled.

* * *

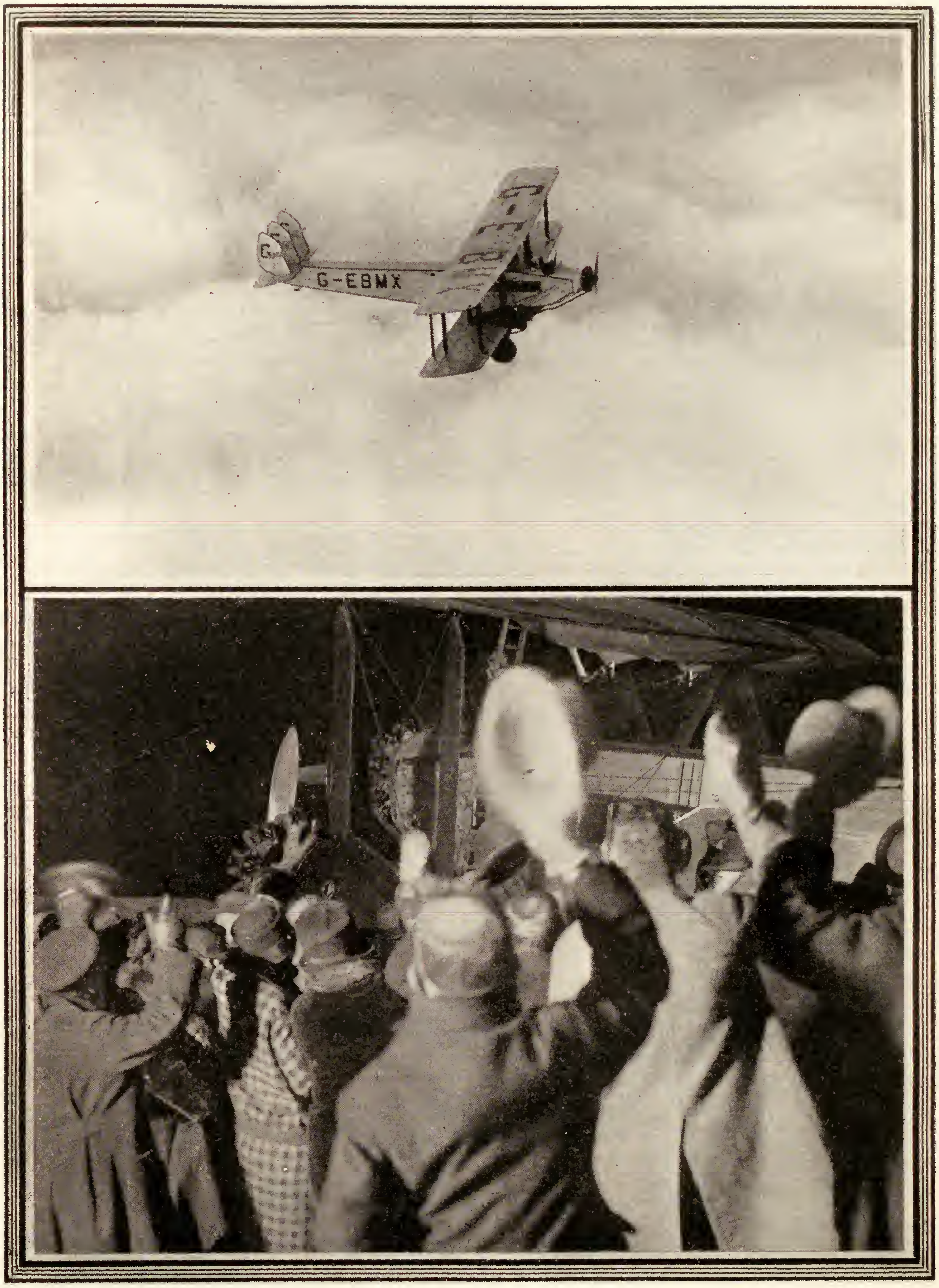
The Seaplane

In connection with Sir Samuel Hoare's memorandum on Imperial air lines the following passage occurs: "In the meanwhile we in Great Britain should be interesting ourselves in forging the link between London and Egypt. Already we have made considerable progress with the development of flying-boats that will be suitable for the passage of the Mediterranean, and attention is being constantly given to the difficulties that have hitherto blocked the way to an England-Egypt service."

If this sentence means anything at all, and Sir Samuel Hoare is not given to idle talk, as those who know him will agree, it means that it is not the intention of the Government to sit down and wait for the arrival of the commercial airship before commencing the "home leg" of the Empire air route, but to push ahead with heavier-than-air craft, the capabilities of which we already know, while those of the airship must remain somewhat speculative for another year or two at least.

This is good news, indeed, and in some ways is one of the most encouraging passages in the whole publication. There will be no need for us to state again the case for the fullest possible use of the seaplane in Empire air communications. That has already been done so often in FLIGHT that our readers probably know the pros and cons by heart by this time. So far as we are aware, however, this is the first official intimation that the Government has a seaplane policy. We scarcely count as part of such a policy the weekly, we had almost written weakly, service from Southampton to the Channel Islands operated by Imperial Airways.

Perhaps it may be taken for granted that the flying-boats to which Sir Samuel refers are the new Short "Calcutta" type, two of which are on order and under construction for Imperial Airways. It is now permissible to state that these new machines will be all-metal flying boats, powered by three "Jupiter VI" engines, and carrying 15 passengers each. They will have a range of 500 miles, or sufficient for crossing either the Mediterranean or the North Sea, and will have a wing spread of 93 ft., and a total loaded weight of 19,600 lbs.



[" FLIGHT " *Photograph*

THE FIRST IMPERIAL AIR ROUTE: Out of the darkness into sunshine. The lower picture was taken in the early hours of Monday morning just before the inaugural flight to India, and shows a small crowd of enthusiasts, who braved the bitter cold, gathered at Croydon to give Sir Samuel Hoare a hearty send-off. Above, the "Hercules" taken from another machine (at 7000 ft.) a few days previously.

THE FIRST IMPERIAL AIR ROUTE

Sir Samuel Hoare Inaugurates the Cairo—Karachi Air Route

MONDAY, December 27, 1926, marks, without doubt, one of the biggest events in the history of British aviation, for the Secretary of State for Air, Sir Samuel Hoare, not only officially inaugurated the first of what we hope will be a chain of Imperial air routes, linking up the various Dominions with the Mother Country, but the Air Minister, in addition to flying nearly 3,000 miles in the first scheduled machine from London to Egypt, thence over the new route to Karachi (another 2,000 miles), is also taking the opportunity on his arrival in India of making an extended inspection of all the R.A.F. stations on the north-western frontier of India—again employing the aeroplane as his means of transport.

It was still dark—and bitterly cold—when a small crowd assembled on Croydon aerodrome on Monday morning to witness the start of the first official flight to India by the " Hercules " No. 3. Just before Sir Samuel Hoare and Lady Maud Hoare left home for the aerodrome the following telegram from the King was received :—

" The Queen and I wish you and Lady Maud *bon voyage*, a successful visit, and a safe return home.—GEORGE R.I."

Among those present to see Sir Samuel's machine off and wish the party Godspeed were Air Chief Marshal Sir Hugh Trenchard, Air Marshal Sir John Salmond, Air Vice-Marshal Sir Vyell Vyvyan, Lieut.-Col. I. A. E. Edwards, Sir Eric Geddes, Sir Samuel Instone, Mr. F. G. Bertram, Capt. Geoffrey de Havilland, Mr. R. Fedden, Mr. R. J. Meller, M.P. (for Mitcham Division of Surrey), and Col. the Master of Sempill and Mrs. Sempill.

Just before 7.30 a.m., the hour at which the machine was scheduled to start, Sir Samuel and his party took their places in the machine to the accompaniment of hearty cheering from those standing around. The party included, in addition to Sir Samuel and Lady Maud, Air Vice-Marshal Sir Geoffrey Salmond (who is journeying to India to take command of the R.A.F. in India), Mr. C. Ll. Bullock, Sir Samuel's private secretary, Corpl. Hetherington (R.A.F. Records Department, Sir Samuel's batman), and Mr. B. W. G. Emmott, who was with Sir Alan Cobham on the London–Cape Town flight, and who will take still and moving photographic records of the present flight. The crew consisted of Capt. F. L. Barnard (pilot), Sq.-Ldr. E. L. Johnson (navigator), Mr. Hatchett (wireless operator), and Mr. Mayer (Bristol Aeroplane Co.).

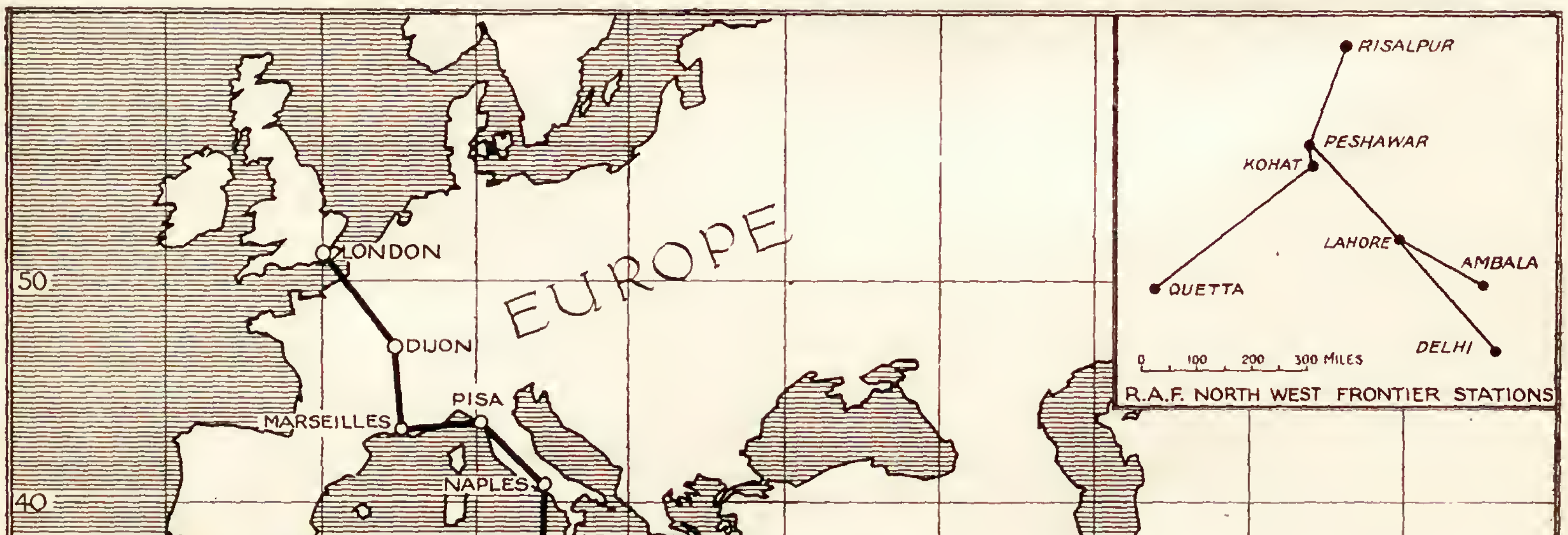
Weather conditions on this occasion were of the curate's egg variety, and although visibility promised to be fair, there was a strong north-east wind blowing, and weather reports indicated a probability of snow storms being encountered *en route*. It was at 7.36 a.m. that the D.H.66 " Hercules " opened out its three Bristol " Jupiter " engines and took off in the semi-darkness, with all its navigation lights on. Barnard did not circle the aerodrome, but set out straight for the coast as soon as he got the machine well off the ground. The " Hercules " was soon lost to view, and so started the first of our Imperial air routes. Then, it was a thrilling event, but, as Sir Samuel remarked just before he left, in a few years' time the air route to India " will be a very ordinary way."

" Hercules " No. 3 passed over Le Bourget at 9.40 a.m. and arrived at Dijon at 11.30 a.m. The Air Minister was received here by the Minister of Commerce and the Mayor, and after lunch the machine proceeded on its journey at 1 p.m. Marseilles was reached at 3.45 p.m.

References to this first Imperial air route have already appeared on several occasions in FLIGHT, so that it will only be necessary for us to mention here that the route is divided into two sections : (1) Cairo, Gaza (or Ziza), Rutbah Wells, Baghdad, and Basra ; (2) Basra, Bushire, Bandar Abbas, Charbar and Karachi. At first the service will be a fortnightly one over the first section (Cairo–Basra) only, starting on January 12, 1927, so timed as to connect with the ocean liners from and to England.

As soon as the five D.H. " Hercules " machines have been delivered, and, incidentally, experience has been gained of the complete route, the service will be extended to Karachi. The full time-table then will be as follows : Eastbound machines will leave Cairo for Ziza at 1 p.m. on Wednesdays, proceeding from Ziza at 6 a.m. the next day, arriving at Basra at 5.35 p.m., proceeding from Basra at 6 a.m. (Friday), arriving at Bandar Abbas at 3.45 p.m., proceeding from Bandar Abbas at 6 a.m. (Saturday), and reaching Karachi at 4.45 p.m. Westbound times will be : Thursdays, Karachi, dep. 6 a.m., arr. Bandar Abbas, 4.15 p.m. on Fridays, Bandar Abbas, dep. 7 a.m., arr. Basra 4.25 p.m. ; Saturdays, Basra, dep. 6 a.m., arr. Ziza 5 p.m. ; Sundays, Ziza, dep. 7 a.m., arr. Cairo, 10 a.m.

On the inaugural flight, which started on Monday, no-



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THE FIRST IMPERIAL AIR ROUTE : Sketch Map showing the route to be taken by Sir Samuel Hoare during the inaugural flight from Croydon to India. Inset, the R.A.F. Stations to be visited.

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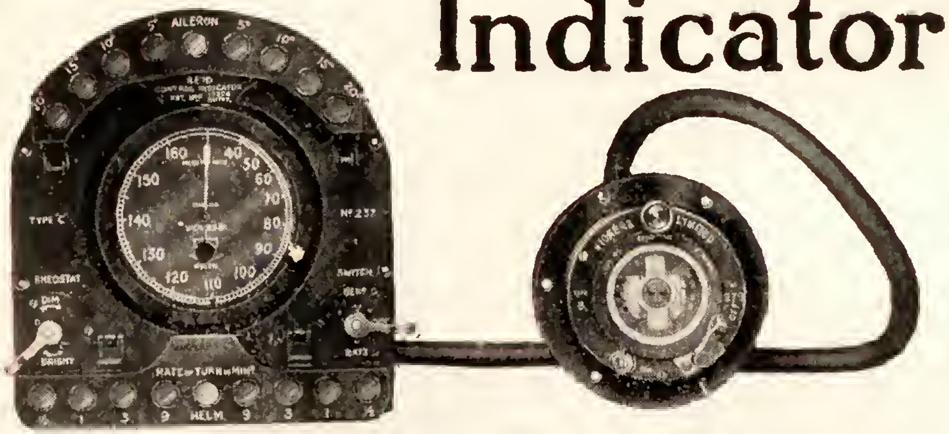

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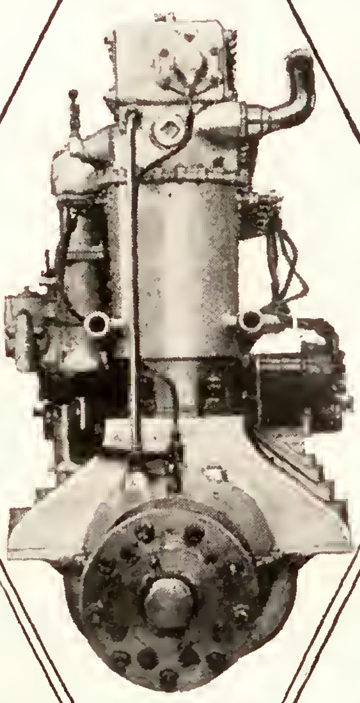
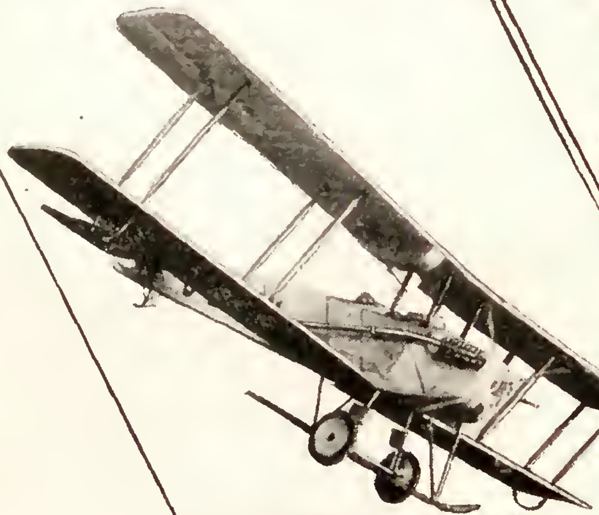


300-330 h.p. A.D.C. 'NIMBUS.'



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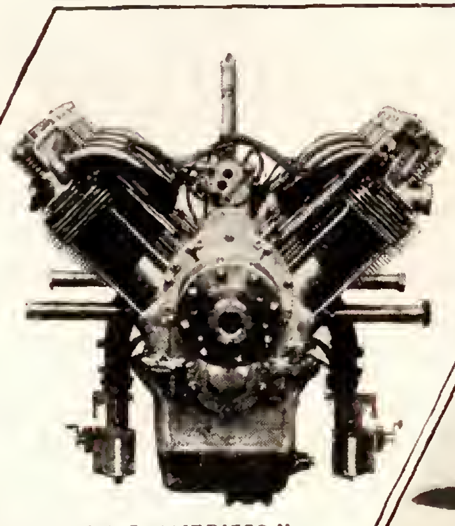
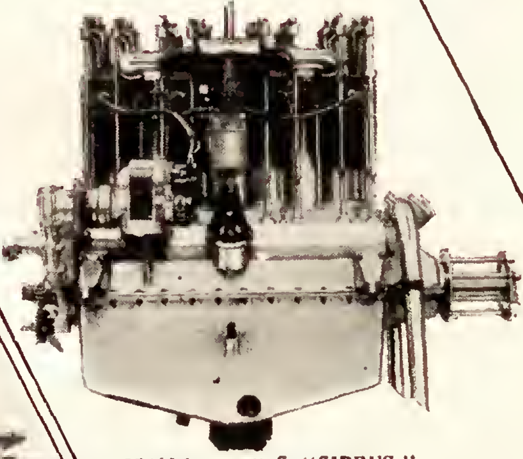
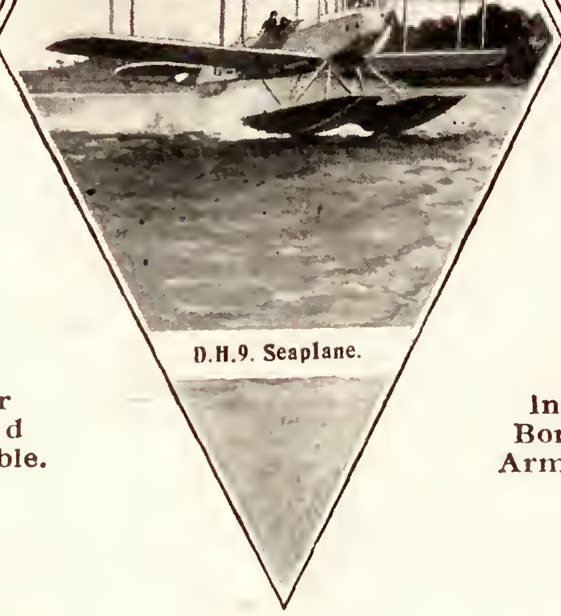


120/140 h.p. A.D.C. "AIRDISCO."



27/60 h.p. A.D.C. "CIRRUS."



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["Flight" *Photograph*

THE FIRST IMPERIAL AIR ROUTE : This photograph was taken at Croydon just before the start ; standing beside the D.H. " Hercules " (from left to right) are Capt. F. L. Barnard (pilot), Lady Maud Hoare, Sir Samuel Hoare, Sir Eric Geddes, Sir Samuel Instone, Mr. Bullock, and Air Vice-Marshal Sir Vyell Vyvyan.

attempt is being made to accomplish a fast journey. For one thing, it is probable that some time will have to be set aside at various stops *en route* for semi-official visits, conferences, etc. The following, however, is the provisional itinerary, which will be adhered to as far as possible :—

December 27, 1926.—Croydon, Dijon (lunch), Marseilles (641 miles).
December 28, 1926.—Marseilles, Pisa (lunch), Naples (574 miles).
December 29, 1926.—Naples, Malta (410 miles).
December 30, 1926.—Malta, Khoms (lunch), Benghazi (580 miles).
December 31, 1926.—Benghazi, Sollum (lunch), Aboukir (650 miles).
January 1, 1927.—Aboukir, Ziza for Amman (360 miles).
January 2, 1927.—Ziza, Rutbah Wells (lunch), Baghdad (543 miles).
January 3, 1927.—Baghdad, Basra (lunch), Bushire (520 miles).
January 4, 1927.—Bushire, Lingeh (lunch), Jask (556 miles).
January 5, 1927.—Jask, Pasni (lunch), Karachi (600 miles).

At Baghdad the machine will be joined by the Director of Civil Aviation, Sir Sefton Brancker (who is now on his way there in the first of the D.H. " Hercules " air liners which left Croydon on December 18) and Maj. Woods Humphery, general manager of Imperial Airways.

From Karachi the flight will be continued to Delhi, *via* Jodhpur (390 miles), where a stop for the night will be made before completing the final 300 miles to Delhi. At Delhi the Viceroy will christen the machine " City of Delhi," and after spending a few days at Delhi in conference with the Government of India, Sir Samuel, together with Sir Geoffrey, will begin his tour of inspection, in Service machines, of the R.A.F. stations (N.W. Frontier), visiting Ambala, Lahore, Peshawar, Risalpur, Khyber, Kohat, Arawali, and Quetta.

The Air Minister having completed his tour of the R.A.F. Air Stations, will return to Delhi for the home flight. It is expected that on the way home Sir Samuel Hoare and Sir Sefton Brancker will visit Khartoum, in order to be present at the inauguration of the Khartoum-Kisumu air service.

The tour of the Indian R.A.F. stations will cover roughly 2,000 miles, so that, together with the 6,200 miles from Croydon to Delhi plus the journey home, the Air Minister will have covered a total distance of nearly 15,000 miles in about six months.

In the meanwhile the first two D.H. " Hercules " air liners, which left Croydon on December 18 and December 20 respectively, have been pushing on towards Cairo. The first machine, carrying Sir Sefton Brancker, left Marseilles at 7.30 a.m. on December 20, and reached Naples at 4.30 p.m. that afternoon. No. 2 machine, piloted by Capt. Hinchliffe and carrying eight passengers (including two women), which left Croydon on December 20, arrived at Marseilles the same afternoon.

Leaving Naples at 10 a.m. on December 21, No. 1 machine experienced an adventurous time in attempting to reach Malta. Battling against a strong head wind, it passed over Messina at 11.30 a.m., but did not reach Malta when expected. Later in the day a message was received to the effect that a landing had been made at Catania, Sicily, and that it was decided to stay there the night. In the meantime " Hercules " No. 2 was catching up, having completed the Marseilles-Naples stage that same day (December 21).

Weather conditions improved on December 22, and both machines set out for Malta—No. 1 from Catania, and No. 2 from Naples. Sir Sefton's machine reached Halfar aerodrome (Malta) first, at 11 a.m., No. 2 arriving an hour and a half later. The next day the 230-mile sea crossing to Africa was successfully accomplished by both machines, No. 2 leaving Malta first, arriving at Khoms at 7.40 a.m., followed at 9.18 a.m. by No. 1.

Cairo was reached on December 24, No. 2 arriving first at 4.50 p.m., having established a record by accomplishing the 2,900 miles to Cairo in 26 hours 12 mins. No. 1 had slight trouble with the landing wheels at Sollum, and arrived at Cairo in the evening. This machine, with Sir Sefton Brancker on board, left Cairo for Baghdad, *via* Ziza, on December 27. No. 2 will stay at Cairo.

AIR MINISTRY NOTICES TO AIRMEN

Civil Air Navigators : Regulations for the Issue of Licences

In consequence of recent amendments to Annex E of the International Air Convention, new regulations governing the circumstances in which a navigator must be carried on aircraft and minor changes in the syllabuses of the examination for the first and second-class licences will be brought into force as from January 1, 1928. The requirements will be to the following effect :—

I.—*Requirements concerning the Carriage of Navigators*

1. There shall be two classes of licences for navigators, viz., second class and first class.

2. A navigator who holds a second-class licence shall be on board :—

(*a*) every flying machine carrying passengers or goods for hire or reward, and having to make a continuous flight
of more than 100 miles over inhabited regions, or
of more than 100 miles but not more than 310 miles entirely over the high seas or uninhabited regions, or
of more than 15 miles but not more than 310 miles by night ; and

(*b*) every airship of less than 700,000 cubic feet capacity, for every journey or flight.

3. A navigator who holds a first-class licence shall be on board :—

(*a*) every flying machine carrying passengers or goods for hire or reward and having to make a continuous flight of more than 310 miles either entirely over the high seas or uninhabited regions, or by night ; and

(*b*) every airship of 700,000 cubic feet capacity or more, for every journey or flight.

4. A flying machine pilot who holds the necessary navigator's certificate may, even if he is alone on board, fulfil the duties of navigator :—

in the case of day flights over inhabited regions, or in the case of day flights of not more than 310 miles over the high seas or uninhabited regions, or

in the case of night flights over routes suitably marked and recognised as such by the competent authorities.

A flying machine pilot shall not perform the functions of navigator, either on a continuous flight of more than 310 miles over the high seas or uninhabited regions, or on a flight by night except in the case provided for in the preceding sub-paragraph, unless a second pilot is on board, who can in case of need take charge of the flying machine.

When, in addition to the pilot, an aircraft is required to have on board another member of the crew, the latter, if he holds the necessary navigator's certificate, may fulfil the duties of navigator, in the cases provided for in paragraphs 2 and 3 above.

NOTE.—For the purpose of the foregoing paragraphs :—

An " uninhabited region " is a region where, in consequence of the sparsity of the population and of the absence of natural landmarks or of the insufficiency of the maps, the difficulties of navigation are similar to those met with over the high seas.

A " night flight " is a flight which normally will continue for more than an hour after sunset or a flight commencing more than an hour before sunrise.

A " flight over the high seas " is one in the course of which an aircraft, in following a straight line, may find itself at a distance of more than 30 miles from the nearest shore.

II.—*Requirements for Navigators' Licences*

A.—*Second-class Licence*

1. *Air Experience.*—The candidate must produce proof that he has had at least two years' air experience as an operative member of the crew of an aircraft, during which at least 300 hours must have been spent in the air.

2. *Subjects of Examination.*—

(i) Form of the Earth ; its divisions and their notation.
(ii) Maps and charts : how to read and use them ; practical properties of different projections used in aviation.
(iii) Earth's magnetism, compasses, their construction, use and adjustment.
(iv) Flight by dead reckoning, with the use of instruments for the measurement and calculation of the elements of the triangle of velocities.
(v) Navigation by radiogoniometric bearings ; methods of fixing the position of an aircraft, with the application of the necessary corrections.
(vi) International air legislation ; regulations for preventing collisions at sea, publications for the assistance of navigators.
(vii) Meteorology ; meteorological observations, arrangements for the issue of meteorological reports for aviation ; principles of forecasting, construction and interpretation of synoptic charts, climatology.
(viii) Visual signalling.

(*a*) Use of signalling apparatus :—

(1) Semaphore—Ground. Ability to send and receive accurately messages made in plain language at the rate of 10 words per minute.

(2) Flashing—Ground and Air. Ability to send and receive accurately messages made either in coded groups or in plain language and numerals at the rate of eight words per minute on the ground and six words per minute in the air.

(As regards the rates of words referred to in (1) and (2) above, each word or group equivalent to a word will consist of at least five signals (letters or numerals.))

(*b*) Semaphore and Flashing Procedure. Detailed knowledge of the procedure for opening up communication and conducting messages by both of the above methods.

(*c*) International Code—Flags. Names and colours of the flags. Methods of reading the flags when hoisted.

B. *First-class Licence.*

1. *Air Experience.*—The candidate must produce proof that he has had at least four years' air experience as an operative member of the crew of an aircraft during which at least 600 hours must have been spent in the air, not less than 100 hours of this being experience of navigation in the air and not less than 15 hours being air experience in night-flying.

2. *Subjects of Examination.*—

(i) Form of the Earth ; mathematical calculation of the various elements, *i.e.*, " the sailings " to obtain course and distance.
(ii) Maps and charts ; principles of construction of the common forms of projection used in aviation.
(iii) Tides ; elementary theory and prediction by the aid of tables.
(iv) Astronomical navigation, various methods of fixing the position of an aircraft, with the use and care of tables, diagrams and instruments for the solution of this problem, knowledge of the mathematics involved.
(v) Meteorology, more advanced knowledge of the subjects detailed in the requirements for the second-class licence.
(vi) General knowledge of wireless telegraphy and of the handling of internal-combustion engines used in aviation.

III.—*Requirements for the Issue of Licences*

Applicants for licences will be required to satisfy the examining board of the Air Ministry that they fulfil the conditions as to air experience, and will be required to pass an examination which will take the form of written papers, oral examination and practical tests. Candidates before taking the examination for a first-class licence must pass the examination for a second-class licence.

Further details concerning the syllabuses of these examinations, together with notes on books for study, can be obtained on application to the Secretary (C.A.2), Air Ministry, London, W.C.2.

IV.—*General*

Examinations in connection with the issue of navigators' licences are held about once every three months at the Air Ministry. Announcements concerning the dates of these examinations are notified periodically in Notices to Airmen.

The papers on visual signalling for the second-class licence and general knowledge of wireless telegraphy and of the handling of internal-combustion engines used in aviation for the first-class licence, are not included in the examination at present, but will be introduced on January 1, 1928, when the new regulations come into force.

No. 82 of 1926

Fitting of Safety Belts

IT is notified that with reference to Notice to Airmen No. 17 of the year 1926 and to the Air Navigation Directions, 1926 (A.N.D.6), para. 49 (1) (i) (a) of which stipulates that

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a safety belt must be carried in all flying machines for each person (including the pilot) carried in an open cockpit and that such equipment must be maintained in working order, the attention of pilots is drawn to the necessity for ascertaining before flight that the belts are properly secured in all cases.

When a seat is unoccupied the safety belt should be so fastened as to avoid the possibility of fouling the controls. (No. 83 of 1926.)

NOTICE TO GROUND ENGINEERS.

Magnesium Alloy Castings.

IT is notified that owing to the corrosive tendencies of magnesium alloy castings (*e.g.*, electron metal) particular attention must be given to aircraft parts made of this material when periodic examinations are being conducted. Any parts showing depreciation as a result of corrosion must be replaced. No. 4 of 1926.

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CIVIL AVIATION IN AUSTRALIA

THE following are the official statistics of the Australian commercial air services, for which we are indebted to the *Fly Paper*, the official organ of the Australian Aero Club (N.S.W. Section).

The period covered for the figures given below is from December 5, 1921, to September 9, 1926. In addition to the operations contained in the table, the companies concerned—Western Australian Airways, Ltd. ; Larkin Aircraft Supply Co., Ltd., and Queensland and Northern Territory Aerial Services, Ltd.—engage in considerable taxi work, etc., off the service routes, the figures for which are not included in the table.

Route.	Perth–Derby (W.A.).	Larkin Services.*	Charleville–Camooweal (Queensland).	Totals.
Length of route (miles)	1,442	1,000	825	3,267
Date inaugurated	Dec. 5, 1921§	June 2, 1924*	Nov. 2, 1922†	—
Frequency of service	Weekly, each direction	‡	Weekly, each direction	—
Machine flights	3,980	2,261	2,888	9,129
Machine miles	667,593	283,502	288,565½	1,239,660½
Hours flown	8,837 : 20	3,645 : 5	3,720 : 15	16,202 : 40
Paying passengers carried over single stages	3,091	1,149	3,265	7,505
Paying passenger miles	553,221	131,158	311,040½	995,419½
Paying passengers injured on scheduled trips	Nil	Nil	Nil	Nil
Letters carried (to end of August, 1926)	796,765	16,237	60,878	873,880
Freight carried (lbs.)	63,351	393¾	31,572	95,316¾

§ Geraldton–Derby, December 5, 1921 ; Perth–Derby, January 15, 1924.

† Charleville–Cloncurry, November 2, 1922 ; Charleville–Camooweal, February 7, 1925.

* From June 2, 1924, to July 19, 1925, a weekly service was maintained by the Larkin Aircraft Supply Co., Ltd., between Adelaide and Sydney (790 miles). On July 19, 1925, the Adelaide–Sydney route was discontinued, but on July 21, 1925, the following services were inaugurated :—

‡ Once each way weekly—(1) Adelaide–Cootamundra, via Mildura and Hay (578 miles). Twice each way weekly—(2) Broken Hill–Mildura (189 miles). (3) Melbourne–Hay (233 miles).

All companies fly 7,378 miles weekly, viz. :—

Western Australian Airways, Ltd.	2,884 miles.
Larkin Aircraft Supply Co., Ltd.	2,844 ,,
Queensland and N.T. Aerial Services, Ltd.	1,650 ,,

BRISTOLS IN CHILE : For some time past the Chilian Air Force has been employing a number of Bristol-Lucifer School machines with highly successful results—both as regards machine and engine. We show above a picture of a formation of seven of these Bristol-Lucifer 'buses at an Air Display held last September at El Bosque Aerodrome, near Santiago. Below, the seven machines are shown lined up on the aerodrome.

AIRISMS FROM THE FOUR WINDS

Landing on Helvellyn

After having made two unsuccessful attempts previously, Mr. John Leeming, Chairman of the Lancashire Aero Club, succeeded last week in landing an aeroplane on the summit of Mount Helvellyn, the famous Lake District mountain of 3,100 ft. Mr. Leeming's first attempt has already been reported in Flight, and on December 21 he had a second try, when he flew from Woodford in the Avro "Gosport," fitted with an Avro "Alpha" engine, with Bert Hinkler, the Avro test pilot, as passenger. On this occasion, they encountered a gale, which in the regions of the mountains proved too much for them, so they returned to Lancaster. Here they spent the night, since ignition trouble had developed in the meanwhile. The following day conditions were much more favourable, so they set out for the third attempt. Mr. Leeming had previously paid a visit, on foot, to his lofty aerodrome in order to see how the land lay (mainly on the rough side, he found), and to mark out suitable landing spots. This latter was accomplished by means of strips of coloured material pegged out to mark the dangerous spots, whilst a fire was also lit in order to indicate the direction of the wind. As a matter of fact, Mr. Leeming did not land on any of the places originally "air-marked," but instead, managed to bring his Avro down within ten yards of the stone cross which marks the summit of the mountain. Here photographs were taken, and a "witness" signed a certificate, after which they successfully took off and returned safely to Woodford. Mr. Leeming stated that the air currents round about the mountains were very treacherous, and that they received several alarming bumps and drops—on one occasion the machine made a sheer drop of 500 ft.

The "Moths'" Eastern Tour

The two D.H. "Moths," from Lancashire, piloted by Capt. T. N. Stack and Mr. B. S. Leete, are still proceeding merrily eastward. After a few days' stay at Baghdad (where they arrived on December 16) during which they were entertained by their old R.A.F. Squadrons (Nos. 45 and 70), these two pilots continued on their way towards India, and reached Bushire on December 27, having experienced a forced landing at Bandar Dilam en route.

The Spanish African Flight

The Spanish Atlantic Squadron, consisting of three Dornier-Wal flying-boats, under the command of Major R. Llorente, which left Melilla on December 10, for Fernando Po, Spanish Guinea, successfully completed their mission on Christmas Day, having flown to Fernando Po in nine stages, via Casablanca, Las Palmas, Port Etienne, Dakar, Konakry, Monrovia, Grand Bassam, Lagos, and St. Isabel Bay. The two other pilots were Capts. Antonio Llorente and Ignacio Jimenez, and each machine carried in addition two other officers and a mechanic.

Air Vice-Marshal Longcroft Injured

Air Vice-Marshal C. A. H. Longcroft was involved in a motor car accident on December 21, and as a result was seriously injured. He was being driven to London from Bentley Priory, Stanmore (H.Q., R.A.F. Inland Area) when another car coming from the direction of London collided with his car at Edgware. Both cars were badly damaged, and subsequently, the driver of the car which collided with the R.A.F. car was charged at Hendon Police Court of being drunk while in charge of a motor car and with driving in a dangerous manner; he was remanded, on bail, for a week.

Big Flights for the New Year

The year 1927 will probably see several big flights launched. Marquis de Pinedo, the famous Italian pilot, proposes to start on a flight round the world at the end of January; Comm. Franco, the Spanish pilot who flew from Spain to Buenos Aires, is also contemplating a flight round the world. France's effort will consist of a flight by two military airmen, in a Potez 28 (500 h.p. Farman), from Paris to Dakar, Buenos Aires, Panama, New York, and thence to Paris. Great Britain will also make an attempt at a big flight next year, for it is rumoured that Capt. F. T. Courtney is planning a dash to New Zealand in a multi-engined flying-boat, flying by night as well as day.

French Madagascar Flight

Commandant Dagnaux, the third of the French pilots to attempt a flight from France to Madagascar, arrived in his Breguet XIX A-2 (Renault) at Leopoldville on December 22. He left Le Bourget on November 28.

U.S. Army Pan-American Flight.

On December 21, five Loening amphibians (400 h.p. Liberty) of the U.S. Army Air Service, under the command of Major Herbert A. Darque, set out from Kelly Field, San Antonio, Tex., on the first stage of a 20,000-mile "Pan-American" flight round South America. During this tour they will proceed down the west coast of South America to Chile, thence over the Andes to Bahia Blanca, Buenos Aires, and back up the east coast.

LIGHT 'PLANE CLUB DOINGS

The Lancashire Aero Club

Flying report for week ending December 25.—Flying has only taken place on three days, as the aerodrome has been closed for holidays during the remainder of the period. Total flying time, 9 hrs. 45 mins., made up as follows:—

Dual with Messrs. Brown and Cantrill: Messrs. Birley, 1 hr. 15 mins.; Abdulla and Fallon, 55 mins. each; Wade, 40 mins.; Dickinson, 35 mins.; Anderson, 30 mins.; Miss Brown, 30 mins.; Messrs. Nelson and Leigh, 20 mins. each; Goodyear, Hardy and Forshaw, 10 mins. each; Twemlow, 15 mins.

Solo: Lacayo, 25 mins.; Birley, 15 mins.

Joy rides: With Mr. Scholes—Mr. James, 25 mins.; with Mr. Brown—Mr. James, 15 mins.; with Mr. Costa—Mr. Sampedre, 20 mins.

Test flights: 1 hr. 20 mins.

Mr. Birley went solo on Tuesday and put up a good show.

On the following day two members of the club, Messrs. Bert Hinkler and John Leeming, landed an Alpha-Gosport on the summit of Helvellyn. They were greeted by a Greek professor and left again almost immediately.

In view of the widespread public interest aroused by this flight one feels that a hitherto unpublished account of another daring landing should now be made known. Some little time ago those indomitable Lancashire bird-men, Messrs. Becayo and Lanson, put a club Moth down on the sands at Birkdale and the following intimate narrative is now given to the public: "As we left Woodford aerodrome on our pigmy aero-foil the sun was shining brightly in the South of England. Striking westward through a dense fog, and steering our course by means of canals and gasometers, we at last reached Southport and, after doing three figures of eight, to show local authorities that we had taken our "A" licence, we glided down towards the Birkdale sands. Barely 200 yards to our left towered the rugged sandhills, while on our right the cruel waves of the sea, which was at high tide, lashed the sands at a distance of not more than 2 miles. As we neared the ground we passed over several wicked-looking lumps of seaweed, while the whole shore was strewn with broken sea-shells. As we landed the 'bumps' were so terrific that had our heads not been screwed on exceptionally firm we must inevitably have lost them. Our landing was observed by several gentlemen in the neighbourhood, one of whom wrote out a certificate and sent it to the chairman. This was unfortunate, as it got us into a spot of trouble with the flying sub-committee."

It appears to us that we, the correspondent, will also be getting into a spot of trouble if we say much more, so we will be serious for a moment and offer our heartiest congratulations on their achievements to everyone concerned. In case this should not pacify them we would add that we shall be out of England by the time this appears, and propose to remain there for some time and have taken adequate precautions for the protection of our wife and children during our absence

P.S.—We note the Hampshire Club's suggestion of last week. We think very highly of the Hampshire Club, and are grieved that they should have such a low opinion of us as to suppose that we would lend them half-a-crown!

The Newcastle-upon-Tyne Aero Club, Ltd.

Report for week ending December 26.—Total, 7 hrs. 7 mins. 4 hrs. 37 mins. Moth, 2 hrs. 30 mins. Avro.

Dual, 2 hrs. 10 mins.; solo, 2 hrs. 5 mins.; tests, 22 mins.

The following members had instruction with Mr. J. D. Parkinson: Messrs. Turnbull, J. M. Kennedy, Stawart.

Mr. J. D. Irving flew solo twice on Sunday. Mr. C. Thompson with Mrs. Heslop. Mr. R. N. Thompson took up several passengers.

The Avro was in great demand on Sunday—the first time, with the exception of some tests, that it has been flown since arriving.

Mr. W. Baxter Ellis flew with Mrs. Ellis and Master Herbert Ellis, Mr. W. H. Leete, and Mr. J. M. Kennedy; Mr. H. H. Leech with Mr. G. Holmes and Mr. P. Holmes; Mr. J. D. Parkinson with Mrs. and Miss Tiley, Miss Keen, Mr. M. G. Thirlwell, Mr. Ogdon, Mr. Robson, and Mr. Jennings.

The engines of the Moth and the Avro have both been changed during the week, so that the machines were ready for work during the holidays. L Y will be ready for delivery about January 20.

R. M. KINDERMAN
COLLECTION

The AIRCRAFT ENGINEER

FLIGHT
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SECTION

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December 30, 1926

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OUR CONTRIBUTORS

This issue of The Aircraft Engineer is mainly in the form of a series of reflections on the machines exhibited at the Paris Aero Show, which has just concluded.

Mr. J. D. North has for once abandoned his series of articles on "Aircraft Performance," and has instead devoted his attention to some impressions of the show. His opening remarks should, we think, be kept in mind in reading some of the criticisms which he has to offer. There is undoubtedly a tendency to look with distrust upon something with which one is unfamiliar, something in our nature that, in a slightly different form, caused the saying "who is 'e ? A Foreigner ! 'Eave a brick at 'im." Not that we would suggest for one moment that Mr. North is "'Eaving bricks." In point of fact, we think it will be agreed that he is treating his subject in a most sympathetic manner, and is obviously greatly concerned to be scrupulously fair, earnestly trying to get at the fundamental reasons underlying much that may seem to us obscure or incomprehensible.

It will be noted that Mr. North has seen something at the Paris Show which has pleased him a good deal, chiefly the skill in forging displayed by the Forges Foulain, an example of whose work is the Breguet spar box of forged duralumin. There is no doubt that this is a very fine specimen of the forger's art, and it might be difficult to get it made in this Country, but the question that one naturally asks is whether it is really necessary.

Another point in Mr. North's article which deserves attention is the reference to the channel-section duralumin construction on the S.I.M.B. (Bernard) single-seater fighter, type 12 C.1. This machine made a belated appearance at the show, and may have been missed by early visitors. It is a development of a "freak" racer exhibited at a previous show, and has multispar wing construction. Personally we cannot quite share Mr. North's appreciation of this form of construction, although we do agree that the production of tapered strip duralumin may open up a wide field for development.

Major F. M. Green also deals with tendencies of design at the Paris show, and to some extent his views appear to tally with those expressed by Mr. North. He points out what seems to us a fundamentally important difference between British and French policy, ours being based upon the possibility of repair, while the French appears to be based upon that of replacement. This is a fact that may help a very great deal to throw light upon, and even to explain altogether, such differences in methods as will have been observed.

THE PARIS AERO SHOW.

Some Impressions.

By J. D. North, F.R.Ae.S.

The critical appreciation of foreign engineering products is a task of considerable difficulty. They are as much indigenous as cooking or dress, and arouse easily enough the innate xenophobian instincts which to a greater or lesser degree pervade the human race. To see something different arouses incredulity and even hostility. A writer on psychology has termed this innate hostility to novelties "alexie" (αλεξειν), because it arises from a train of thought which conveys to the mind some danger of disturbance to its preconceived opinions and to the personality some risk to its reputation, established or otherwise. So was Wagner hissed and Picasso ridiculed; not as foreigners in a national sense, but men of strange ways in their profession.

We ought to put severely out of our minds the idea that our methods are necessarily generally applicable or even, (if it be possible to do so), that they are right. The statement that an engineering product is difficult to make, often on analysis is found to mean that the critic does not know how the product may be or is made, and his criticism is purely a subconscious alexie impulse. Although I have outlined the pitfalls that beset the critic I have not much confidence in my ability to avoid them in giving a critical appreciation of the *Salon de l'Aeronautique.*

Considering first the question of general arrangement one should find here indication of some definite logical purpose to attain, either special aerodynamic advantages, economic structure, manufacturing economy, or special facilities for military functions such as good views, free arcs of gun fire, etc. One very characteristic type of structure arrangement is shown in Fig. 1, types of which are seen in the Nieuport-Delage, 42 C. and 48 C., and in the Brégnet type 19 and 26 T. A special feature of this arrangement is that in order to obtain a favourable angle for the lift wires or corresponding structure these wires are attached to the undercarriage. In the case of the Brégnet, a very considerable relief of the compression in the top wing spars is obtained in this manner, while in the Nieuport 42 C. a small bottom plane exists to stabilise the long supporting strut to the principal parasol wing. The disadvantage of this type of structure, which offers certain undoubted economies from the point of view of weight, is the limitation placed upon undercarriage travel and the susceptibility of the whole wing structure to be damaged by bad ground conditions. As is well known, the shock-absorbing mechanism of the Bréguet machines is accommodated within the wheels, which are of cast aluminium alloy. In the case of the Nieuport, the axle fairing, which is exaggerated almost to a small wing, is extended beyond the undercarriage supporting struts so that the shock-absorbing mechanism is carried in bending, and the wheels pushed out far enough to clear the diagonal strut. In the case of the 42 C.1, the wheel is also displaced forward in relation to the diagonal strut. It would appear to be almost impossible to associate this class of structure with the shock-absorbing capacity demanded by English custom. The elastic travel on these machines is ample for taxying purposes and for landing under reasonably favourable conditions; but the vertical velocity of descent with which they can deal is very small compared with that of average English practice.

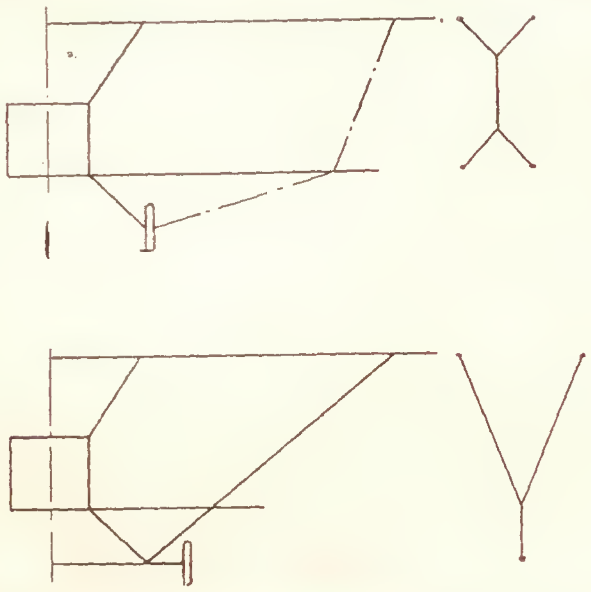

Fig. 1: Above, a diagrammatic representation of the wing bracing of the Breguet Machines. Below, that of the Nieuport-Delage 42.

Experience of undercarriages during the war did not lead to any conclusive evidence in favour of the replacement of elastically sprung undercarriages with small travel by hydraulic shock-absorbing devices, but post-war experience of the favourable influence on maintenance, of the more efficient type of shock-absorbing mechanism seems to indicate a real military and commercial advantage.

The alternative type of machine is a single-seater fighter with parasol wings, as exemplified in the Gourdou-Lescurre. In this case the supporting struts of the parasol are taken from the fuselage and the struts themselves are stabilised by additional structure, following in fact, the lines of the older Morane-Saulnier wing arrangement. This structure is not a light one, and would appear to offer a considerable resistance, but it undoubtedly gives to a pilot a very exceptional forward and downward view. An interesting comparison is obtainable between the Gourdou-Lescurre fitted with a "Jupiter" and one fitted with a Lorraine engine, a slight advantage in performance, particularly on climb and speed at height, being indicated for the former. Particulars of the comparative details of the two machines were given in FLIGHT of December 2. The internal arrangement of the cockpits of these machines is very compact and the bodies are small, but all the single-seater fighters appear to carry no electrical equipment for wireless or lighting, while the positions of the machine guns do not seem ideal from the point of view of accessibility. Whether these deficiencies are serious from a military point of view is a matter of opinion, but there is no doubt that they have greatly assisted in simple and compact body arrangement.

The Dyle et Bacalan, a twin-engined bomber, is constructed on lines which have already been tried, without conspicuous success, in the United States. The very thick section of middle wing on which the engines are mounted undoubtedly does afford ready engine accessibility, but such aerodynamical information as is available in respect of this type of installation indicates an abnormally large propeller interference.

The aeroplane as a structure can be interpreted in many varied forms, and its very versatility in this respect allows free rein to the imagination. It is probably true that quite a few aeroplanes are built in accordance with certain general arrangements in consequence of a "brain-wave" on the part of a designer, who produces a novelty without logically knowing the reasons for the arrangement which he adopts. In some cases the results are successful, and in others the type dies a natural death. There is probably more imagination used in the general arrangement of continental designs than in England, but if sometimes results indicate a stroke of genius there is by no means always any real engineering advantage.

The characteristic arrangement of most of the aeroplanes at the Salon requires a structure design to withstand very large bending, and in many cases comparatively slight compression loads. This has naturally had a definite influence on the type of spars adopted. The structure of the Bréguet '19 and the Nieuport C.21 was shown at the last exhibition two years ago. In the case of the monoplane, or "sesquiplane," the plain box girder of aluminium sheet with laminated flanges satisfactorily meets the requirements of heavy variation in bending moment. As in wings of this class deflection is very important, there will probably be little advantage in using a steel spar with undoubted added complications of manufacture. An example of a steel spar of similar type, intended, I believe, for the Dyle et Bacalan machine, is shown on the stand of a steel maker. The construction is of similar type to the spar already described; although the web has been lightened to an N girder, the absence of corrugation makes it necessary to use very thick material, and the spar must be heavy. Incidentally, a spar of similar type is shown in aluminium bronze, autogenously welded. Although this material is excellent from a corrosion point of view, it is hardly suitable for light structures on account of the low value of Young's Modulus and high specific gravity. The top wing spars of the Bréguet have bulbous booms riveted to a single plate web, the web being reinforced with pressed sections riveted on. The lower spars consist of built-up channel sections back to back, with a solid drawn tubular section over them roughly in the form of a figure-of-eight. Another characteristic feature of this type of machine is the member which connects the upper and lower planes, or the planes and the undercarriage in the case of the monoplane or "sesquiplane." In the Nieuport machines two huge "Y"-formed sheets of Duralumin are pressed out and riveted together to form a branching strut of streamline section riveted along its fore and aft edges, apparently without internal support, the shell being sufficiently strong in itself. In the case of the Bréguet strut, which is in the form of a double "Y," an elaborate internal channel structure is used to support the shell, the four ends of the double "Y" terminating in ball and socket joints. It would appear that the labour involved in dealing with the large amount of not very accessible riveting on the Bréguet strut must make is a very much more expensive manufacturing proposition than the Nieuport.

One must examine constructional details in the light of one's own ideas as to the economic lines of structural development. In order that metal construction may be sufficiently flexible to adapt itself to different sizes and types of aeroplanes, it is necessary that it should be constructed to allow for changes in the sizes of the aeroplane or the design. For example, my own firm—Boulton and Paul, Ltd.—have been for some time past concentrating their attention on the realisation of a manufacturing system, the elements of which shall be adaptable to aeroplanes of biplane construction of 2,000 to 20,000 lbs. gross weight, and in which there shall be enough common features between the elements of various sizes to reduce the tool equipment and use of skilled labour to a minimum, to keep down the number of different parts on different aeroplanes and to simplify the problem of maintenance and repair, the principle of which would, in common with the constructional system, pass from one aeroplane to another. It is difficult to see in the Salon any signs of a similar endeavour.

A very complete exhibition is given by the Section Technique of the methods of manufacture of the Bréguet '19. Here is an aeroplane which, with a good performance, has some remarkable records to its credit, and which, having been made in large quantities has been produced at a very reasonable cost. The tooling up of the job appears, however, to be uniquely associated with that particular aeroplane. One notices particularly in the construction of both spars and ribs, and in fact, all the elements of the wings, an enormous amount of riveting, much of which does not lend itself too well to mechanical execution. It is particularly interesting, insomuch as experience leads us to believe that such a feature has an important bearing on cost, to know that in spite of the work involved the machine has still been economically produced. A very liberal use of light alloy stampings is found in the Bréguet construction, and some of these stampings are remarkable examples of the drop stamper's art, notably the stampings shown in Fig. 2, the two halves of which go to form the joint between the bottom spar and the top, being riveted together on the two sides of the figure-of-eight section tube. The corrugated part of the stamping tapers down from the lugs from about 3 mm. thick to 2 mm. thick. One might have suspected that the examples of this article which were exhibited were specimens specially made for show purposes, but on examination of the way in which this stamping is used on the actual construction of the Bréguet wings, it is evident that an extraordinarily high standard of stamping accuracy in a very difficult part has been achieved. This is only one of many examples of light alloy stampings on the Bréguet, and their profusion, notably in the rear fuselage joints which contain three fairly large stampings at each joint, is evidence that they must be produced very economically. The exhibit of the Forges Foulain would seem to indicate that the art of the drop stamper in the manipulation of light alloys has advanced in France to a high pitch. We have here an opportunity for valuable technical development. Some of the alternative types of joint construction to these stampings which are seen on various aeroplanes exhibited are not very pleasing. Where Bréguet has had to make joints which it has not been possible to stamp, the duralumin struts are fitted into welded steel sockets. Welded steel fittings are also used in the elevators, for example, to attach the ribs to the tubular spars and to the leading edge. One presumes that no trouble has been experienced, but the solution of the problem of attaching these members seems unnecessarily crude without being the most economical. In the construction of the S.E.C.M. 150 T some most remarkable examples of complicated tube joints made up from sheet are to be seen. The press work involved in these joints must be extraordinarily difficult and expensive, and there are a very large number of different joints on the aeroplane, while the fittings, owing to the varying angles and numbers of struts which they house, could not possibly have a general application. It is interesting to note that in some cases the difficulty of getting in the last member has caused the designer to close the socket with an aluminium block as in Fig. 3, using a stupendous number of small bolts for the purpose. Both in this case and in the large number of small split-pinned bolts in each fuselage joint on the Bréguet, there would seem to be inevitably heavy assembly costs. Presumably all these machines are designed on the assumption that they will go into production on such a large scale that the complete tooling up for any individual design is justified.

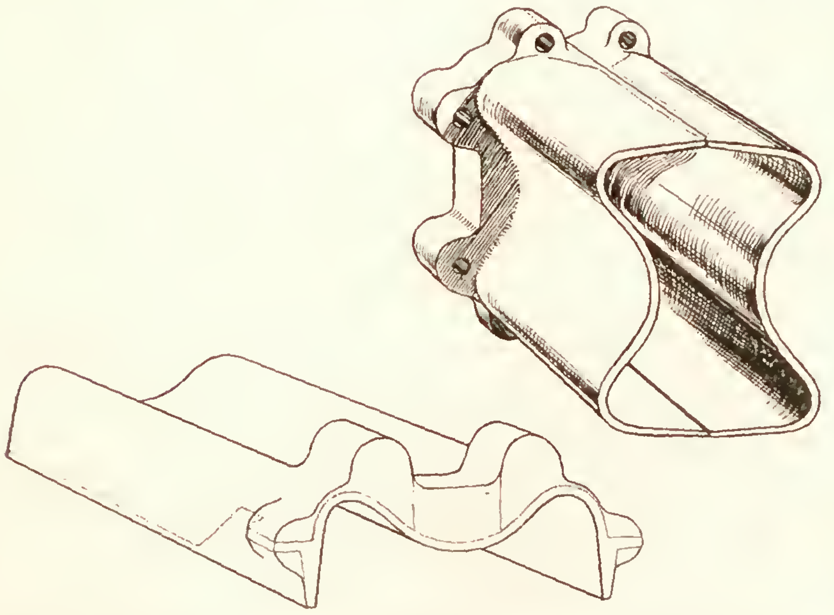

Fig. 2: Details of the forged Duralumin spar box of the Breguet 19: The faint lines in the lower sketch give an idea of the manner in which the part was forged.

There are one or two examples of metal covered wings, the Wibault, a straightforward construction on Dornier lines, and the Avimeta which seems to be an offspring of the large twin fuselage Schneider shown at the last exhibition, and a metal monoplane exhibited by the S.I.M.B., which is of considerable technical interest, the wings being constructed of channel sections running parallel to the span of the machine, turned inwards and riveted together on their inner edges after the manner of the Bréguet cowling. An exhibit on the Duralumin stand of strip up to 8 ins. wide and 18 ft. long, tapering from 12 to 18 gauge along its length, enables one to appreciate how such a structure can be made economically. In the wings the channels are parallel to one another, while assembly panels are fitted to the underside of the wing to enable the riveting work to be completed, and to give accessibility to the interior of the structure. A similar constructional arrangement is used for the body, but with the streamline form the channels are no longer parallel and, consequently, must be more expensive to produce. The possibility of obtaining taper strip as a commercial proposition opens up a wide field of technical development. It is not possible to say whether this taper strip was actually used in the S.I.M.B., but it would be safe to say that if it was not it soon will be.

Besides the steel spar already referred to exhibited by Messrs. Jacob Holtzer, there is also shown on their stand a number of drawn corrugated sections of heat-treated nickel-chrome steel. This material is of a similar class (3 per cent. nickel, 1 per cent. chrome) to that which is generally used for steel construction in this country, but the sections are of much thicker material than we are accustomed to, and the corrugations are of a very slight nature. It is understood that Messrs. Holtzer are pursuing their experiments with regard to corrugated steel spars. On the Dyle et Bacalan machine there are a number of built-up steel box struts of the type shown in Fig. 4, but, as one would expect from this type of section, the steel is of about 18 gauge in order to avoid local buckling. The design, in fact, strikes one as very crude and heavy. It is impossible to believe that such members can compare favourably with steel tubes of appropriate material. Steel construction is also illustrated in the Fiat machine, on which the two halves of the spar have been pressed out into a channel section and riveted together as in Fig. 5, the spars being lightened in the web by perforations which, incidentally, give access for the riveting operation. Here again the thickness of the material rendered necessary by the nature of the design would suggest that the spar is uneconomically heavy compared with modern English practice. The accessibility to the top and bottom parts of the spar allowed by the perforation of the webs is also used to permit the ribs to be riveted directly on to the spars, a type of assembly which has been found rather expensive. Some of the light alloy ribs which were exhibited are made up from channel sections, a form of construction which in aluminium alloys has not been

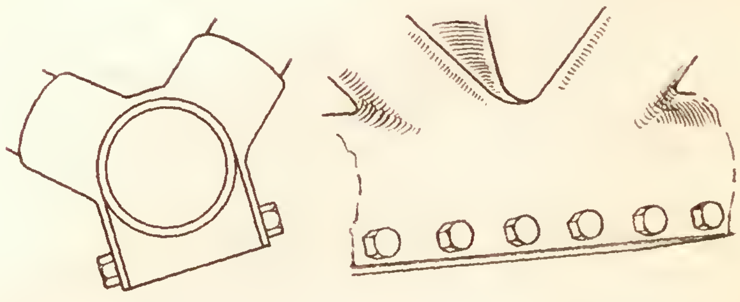

Fig. 3: In certain of the S.E.C M. joints aluminium blocks are used to close the socket, numerous bolts being used.

(*Continued on p.* 108)

TABLE OF PARTICULARS OF AEROPLANES HIBITED AT THE PARIS AIR SHOW, 1926.

Machine and Type.	Purpose.	Power Plant.	Wing Span.		Wing Area.		Weight Empty.		Weight Loaded.		Loading.	Wing Loading.		Span^2/W	"Wing Power."		Max. Speed, Ground Level.		Climb.	Ceiling.		High-speed	Altitude
			m.	ft.	sq. m.	sq. ft.	kg.	lbs.	kg.	lbs.	lbs./h.p.	kg./sq.m.	lbs./sq.ft.		hp./sq.m.	h.p./sq.ft.	km./h.	m.p.h.	Alti. (m.) mins.	m.	ft.	Figure.	Figure.
Aero Ab. 11 Bi.	2-st. Reconnaissance	240 "Perun II"	12·78	(41·9)	36·51	(393)	1,027	(2,260)	1,534	(3,380)	(14·1)	42·0	(8·60)	0·52	6·56	(0·61)	215	(130)	5,000 in 19·3	7,600	(24,900)	27·0	9·4
Armstrong-Whitworth "Ajax"	2-st. Genl. Purpose Bi.	385 A.-S. "Jaguar"	12·0	(39·3)	35·5	(382)	1,018	(2,240)	1,680	(3,700)	(9·6)	47·3	(9·68)	0·42	10·85	(1·01)	225	(140)	5,000 in 24	6,000	(19,700)	19·2	5·1
"Avimeta" A.V.M. 88 Mono.	2-st. Recon. Fighter	500 Hispano-Suiza	17·0	(55·8)	40	(421)	1,550	(3,410)	2.400	(5.280)	(10·6)	60·0	(12·55)	0·59	12·50	(1·19)	240	(149)	5 000 in 16	7 500	(24.600)	20·0	8·5
Bernard 15 C. 14. Sesqui.	Single-st. Fighter	500 Hispano-Suiza	11·4	(37·4)	24·5	(263·5)	—		1.800	(3,960)	(7·92)	73·5	(15·0)	0·35	20·40	(1·90)	270	(167·6)	5,000 in 12·5	7,500	(24,600)	19·5	7·0
Besson M.B. 35 Mono.	Submarine Scout	120 Salmson (Air.)	9·85	(32·3)	16·5	(178)	540	(1,180)	765	(1,680)	(14·0)	46·3	(9·43)	0·62	7·26	(0·67)	163	(101)	2,000 in 12	4.200	(13.800)	10·8	5·2
Besson M.B. 36 Mono.	14-pass. Flying Boat	3-420 "Jupiter"	25·0	(82·0)	130	(1,400)	5,150	(11,300)	8.000	(17.600)	(13·97)	61·5	(12·6)	0·36	9·68	(0·90)	180	(112)	—	—		11·0	—
Blériot-Spad 61 Bi.	Altitude Record Machine	450 Lorraine (super.)	11·72	(38·4)	37	(398)	1,147	(2,520)	1,522	(3,350)	(7·45)	41·2	(8·42	0·44	12·2	(1·13)	283	(176)	—	12.442	(40,800)	34·5	*
Blériot 165. T Bi.	16-pass. Commercial	2-420 "Jupiter"	23·0	(75·4)	119	(1,280)	3,100	(6,820)	5.450	(12,000)	(14·3)	45·7	(9·38)	0·47	7·06	(0·66)	180	(112)	—	—		15·0	—
M. Bondy Avia B.H. 11 Mono.	2-st. Light Plane	60 Walter	9·72	(31·9)	13·6	(146)	352	(773)	580	(1.280)	(21·3)	42·6	(8·77)	0·75	4·41	(0·41)	160	(99·5)	2,000 in 12	4,000	(13.120)	17·0	7·5
M. Bondy Avia B.H. 26 Bi.	2-st. Fighter	420 "Jupiter"	10·8	(35·5)	31·32	(337)	1,060	(2.165)	1.700	(3.740)	(8·9)	54·3	(11·1)	0·34	13·4	(1·24)	240	(149)	5,000 in 20	7,000	(23.000)	18·5	6·1
L. Breguet 19 G.R. Sesqui.	2-st. Long Dist. Recon.	500 Hispano-Suiza	—		52·75	(568)	1,518	(3,335)	4.157	(9.140)	(18·3)	78·8	(16·1)	—	9·47	(0·88)	—		—	—		—	—
L. Breguet 19 H. Sesqui.	2-st. Recon. Seaplane	450 Lorraine	14·83	(48·6)	50·0	(538)	1,350	(2,970)	2.450	(5.380)	(11·9)	49·0	(10·0)	0·44	9·00	(0·84)	200	(124)	4,000 in 30	5.600	(18.350)	16·0	6·0
L. Breguet 26 T. Sesqui.	6-st. Commercial	420 "Jupiter"	—		55·0	(592)	—		2.825	(6.220)	(14·8)	51·4	(10·5)	—	7·64	(0·71)	204	(127)	—	—		19·5	—
C.A.M.S. 37 A. Boat Bi.	3-st. Flt. Spot. Amph.	450 Lorraine	14·5	(47·5)	58·0	(624)	2,000	(4.400)	2,900	(6.380)	(14·2)	50·0	(10·2)	0·35	7·76	(0·72)	170	(115)	3,000 in 35	4.000	(13,120)	11·5	5·4
Caudron C. 104 G.R. Sesqui.	2-st. Long Dist. Recon.	420 "Jupiter"	14·56	(47·8)	44·0	(474)	1,377	(3.030)	1,965	(4.320)	(10·3)	44·6	(9·12)	0·53	9·55	(0·89)	209	(130)	5.000 in 28·8	6.375	(20,900)	16·5	5·6
Caudron C. 59 Bi.	2-st. School	180 Hispano-Suiza	10·25	(33·6)	26·0	(280)	700	(1,540)	1.000	(2.200)	(12·2)	38·5	(7·86)	0·52	6·92	(0·64)	180	(112)	—	—		15·2	—
Caudron C. 168 Bi.	2-st. Touring	60 Salmson	9·0	(29·5)	20·0	(215)	—		584	(1.286)	(21·4)	29·2	(5·98)	0·67	3·00	(0·28)	142	(88·2)	—	3.200	(10,500)	17·5	5·3
Caudron C. 109 Mono.	2-st. Touring	40 Salmson	11·5	(37·7)	20·0	(215)	—		555	(1.220)	(30·5)	27·7	(5·67)	1·16	2·00	(0·19)	125	(77·7)	—	2.600	(8.525)	18·5	6·6
Descamps 17 A. 2 Sesqui.	2-st. Fighter	450 Lorraine	9·35	(30·7)	42	(452)	1,238	(2,720)	2.046	(4.500)	(10·0)	48·7	(9·95)	0·21	10·7	(0·99)	230	(143)	5,000 in 24·9	—		20·5	—
Farman F. 160 B.N. Bi.	Night Bomber	2-500 Farman	26·75	(87·8)	200	(2.150)	4,000	(8,800)	7.000	(15.400)	(15·4)	35·0	(7·16)	0·50	5·00	(0·46)	186	(116)	4.000 in 30	6.000	(19.700)	23·0	7·0
Farman F. 170 T. Mono.	8-pass. Commercial	500 Farman	16·1	(52·8)	52·5	(565)	2,018	(4.430)	3.318	(7.300)	(14·6)	63·2	(12·9)	0·38	9·52	(0·88)	202	(125)	3,000 in 27·4	4.300	(14.100)	15·5	6·5
Fokker C.VD. Sesqui.	2-st. Fighter	450 Hispano	12·5	(41·0)	28·8	(310)	1,290	(2.840)	1,890	(4.160)	(9·25)	65·6	(13·4)	0·41	15·6	(1·45)	255	(158)	5,000 in 17	6,700	(22.000)	19·0	6·7
Fokker F. VII-3m. Mono.	8-pass. Commercial	3-185 Armst. Sid. "Lynx"	19·3	(63·3)	58·5	(630)	2,150	(4,730)	3,600	(7,920)	(14·3)	61·5	(12·6)	0·51	9·49	(0·88)	185	(115)	3.000 in 22·2	4,700	(15,400)	12·3	6·9
Hanriot H. 35 Mono.	2-st. Training	180 Hispano-Suiza	11·4	(37·4)	22·0	(237)	600	(1.320)	950	(2.090)	(11·6)	43·2	(8·82)	0·67	9·18	(0·76)	207	(128)	—	6,500	(21.300)	17·0	6·5
Hanriot H. 41 Bi.	2-st. Training Seaplane	120 Salmson	10·26	(33·6)	34·9	(376)	725	(1.600)	1,000	(2.200)	(18·3)	28·7	(5·85)	0·51	3·44	(0·32)	120	(74·5)	—	—		9·5	—
Hanriot H. 14 S. Bi.	1-pass-Ambulance	80 Le Rhone	10·26	(33·6)	34·9	(376)	—		790	(1,740)	(21·7)	22·6	(4·63)	0·65	2·29	(0·21)	120	(74·5)	—	4,000	(13,120)	13·8	5·4
Koolhoven F.K. 35 Mono.	2-st. Fighter	480 "Jupiter"	11·5	(37·7)	24·0	(258)	900	(1,980)	1,540	(3.390)	(7·05)	64·2	(13·1)	0·42	20·0	(1·86)	260	(161)	5,000 in 14	—		15·6	—
Levasseur "Avion Marin" Bi.	3-st. Flt. Recon.	450 Lorraine	14·6	(47·8)	60	(646)	1,550	(3.410)	2,400	(5.280)	(11·7)	40·0	(8·17)	0·43	7·50	(0·70)	185	(115)	3,000 in 20	5,500	(18,000)	15·0	5·2
Levasseur VI C. 2 Bi.	2-st. Fighter	500 Hispano-Suiza	12·2	(40·0)	40	(431)	1.200	(2.640)	1,986	(4.370)	(8·75)	49·7	(10·1)	0·37	12·5	(1·16)	215	(134)	—	7,500	(24.600)	14·3	6·3
Levasseur 7T. Bi.	6-pass. Commercial	420 "Jupiter"	14·5	(47·5)	60	(646)	1.550	(3,410)	2.700	(5.940)	(14·1)	45·0	(9·2)	0·38	7·00	(0·64)	180	(112)	—	—		15·2	—
Liore & Olivier LeO 21 Bi.	18-pass. Commercial	2-420 "Jupiter"	22·76	(74·6)	106·5	(11,470)	2,690	(5,920)	5.500	(12.100)	(14·4)	51·6	(11·4)	0·46	7·92	(0·73)	192	(119)	—	—		16·3	—
Liore & Olivier LeO 19 Bi.	6-pass. Com. Fl.-Boat	420 "Jupiter"	16·0	(52·5)	64·2	(692)	1,700	(3,740)	3,200	(7.040)	(16·8)	49·9	(10·9)	0·39	6·54	(0·61)	170	(106)	—	—		17·0	—
Loire-Gourdou-Leseurre LGL 32 Mono.	Single-seater Fighter	420 "Jupiter"	12·2	(40·0)	25·0	(269	963	(2.120)	1.370	(3,010)	(7·17)	54·8	(11·2)	0·53	16·8	(1·56)	250	(155)	5,000 in 12	9,750	(32.000)	16·5	8·5
Morane-Saulnier 129 Mono.	2-st. Training	180 Hispano-Suiza	10·7	(35·1)	19·7	(212)	740	(1,630)	1.045	(2.300)	(12·8)	53·1	(10·8)	0·54	9·13	(0·85)	—		—	—		—	—
Morane-Saulnier 132 Mono	2-st. Touring	120 Salmson	10·7	(35·1)	19·7	(212)	655	(1,440)	930	(2,045)	(17·0)	47·2	(9·65)	0·60	6·09	(0·57)	—		—	—		—	—
Morane-Saulnier 35 Mono.	2-st. Training	80 Le Rhone	10·56	(34·6)	18·0	(194)	450	(990)	700	(1.540)	(19·2)	38·9	(7·94)	0·78	4·44	(0·41)	—		—	—		—	—
Ateliers des Mureaux 3 C.2 Mono.	2-st. Fighter	500 Hispano-Suiza	15·0	(49·2)	32·5	(350)	1,170	(2.575)	1.990	(4.180)	(8·37)	61·2	(11·9)	0·58	15·4	(1·43)	245	(152)	—	8.600	(28,200)	17·0	8·6
Nieuport-Astra 42 C. 1 Sesqui.	Single-seater Fighter	500 Hispano-Suiza	12·0	(39·4)	31·75	(342)	1,379	(3,030)	1,808	(4.140)	(8·28)	57·0	(12·1)	0·37	15·7	(1·46)	267	(166)	5.000 in 13·05	8,000	(26.200)	22·0	6·8
Nieuport-Astra 48 C. 1 Mono.	Single-seater Fighter	400 Hispano-Suiza	10·0	(32·8)	19·38	(209)	1,032	(2.270)	1.290	(2.840)	(7·10)	66·5	(13·6)	0·38	20·6	(1·91)	275	(171)	6,500 in 40·23	—		18·0	—
H. Potez 25 A. 2 Sesqui.	2-st. Army Co-op.	450 Lorraine	14·0	(45·9)	46·7	(502)	1,210	(2.660)	1.998	(4.380)	(9·74)	42·8	(8·73)	0·48	9·63	(0·87)	217	(135)	5,000 in 20·35	7,400	(24,300)	19·0	6·4
H. Potez 25 G.R. Sesqui.	2-st. Long. Dist. Recon.	450 Lorraine	14·0	(45·9)	46·7	(502)	1,220	(2,682)	2.365	(5,200)	(11·6)	50·6	(10·4)	0·41	9·63	(0·87)	215	(134)	—	5.800	(19,000)	18·5	6·2
H. Potez 28 G.R. Sesqui.	2-st. Long. Dist. Recon.	550 Renault	16·2	(53·2)	63·0	(688)	1.900	(4.180)	4.770	(10,480)	(19.1)	75·7	(15·2)	0·27	8·73	(0·80)	200	(124)	—	2,500	(8,200)	16·5	*
Salmson-Bechereau C. 2 Sesqui.	2-st. Fighter	500 Salmson	14·6	(52·8)	35·0	(377)	1,558	(3,430)	2,360	(5.180)	(10·4)	67·4	(13·7)	0·53	14·3	(1·33)	220	(137)	5.000 in 20·2	7,150	(23,500)	13·3	8·2
Salmson-Bechereau Mail Bi.	7-pass. Commercial	500 Salmson	16·9	(55·4)	60	(646)	1,840	(4,050)	3,520	(7.740)	(15·5)	58·7	(12·0)	0·40	8·33	(0·77)	190	(118)	—	—		15·0	—
Schreck-F.B.A. 21 Bi.	4-pass. Com. Fl.-Boat	450 Lorraine	15·4	(50·5)	53·5	(576)	1,820	(4.000)	2.840	(6.240)	(13·9)	53·1	(10·8)	0·41	8·41	(0·78)	186	(115)	4,000 in 56	4,400	(14,430)	14·0	5·8
S.E.C.M. 120 B.N. 2 Bi.	2-st. Night Bomber	600 Renault	19·0	(62·3)	85·0	(915)	1,760	(3,870)	3,400	(7.470)	(12·4)	40·0	(8·16)	0·52	7·06	(0·66)	200	(124)	4.000 in 28·5	5,500	(18.000)	21·0	5·5
S.E.C.M. 150 T. Mono.	14-pass. Commercial	3-350 Hispano	23·9	(78·4)	100	(1,076)	4,030	(8,875)	7,300	(16,040)	(15·9)	73·0	(14·9)	0·38	10·5	(0·98)	235	(146)	—	4,800	(15,750)	22·0	8·1
F. Villiers II Sesqui.	2-st. Navy Fighter	450 Lorraine	13·0	(42·6)	40·0	(431)	1,565	(3,445)	2.050	(4,500)	(10·0)	51·3	(10·4)	0·40	11·2	(1·04)	218	(135)	6,000 in 29	6.250	(20,500)	16·0	5·8
F. Villiers V Sesqui.	2-st. Night Fighter	450 Lorraine	12·0	(39·4)	40·0	(431)	1.274	(2,800)	2,105	(4.625)	(10·3)	52·7	(10·7)	0·34	11·2	(1·04)	224	(139)	6,500 in 43	—		18·0	—
Vojenska S. 16 Bi.	2-st. Long. Dist. Recon.	450 Lorraine	15·5	(50·8)	47·0	(506)	1,200	(2,640)	2,250	(4.940)	(11·0)	47·9	(9·77)	0·52	9·58	(0·89)	225	(140)	—	6.500	(21.300)	20·8	6·5
Vojenska S. 18 Bi.	2-st. Training	60 Walter	10·0	(32·8)	17·0	(183)	254	(558)	554	(1.216)	(20·3)	32·6	(6·64)	0·88	3·53	(0·33)	140	(87·0)	1,000 in 6	3.500	(11,500)	14·0	5·5
Wibault 7 C. 1 Mono.	Single-seater Fighter	420 "Jupiter"	11·0	(36·1)	22·2	(239)	827	(1,818)	1,444	(3.175)	(7·56)	65·0	(13·3)	0·41	18·9	(1·76)	222	(138)	5,000 in 15·3	8,500	(27,900)	10·5	7·7

* Falls outside graph.

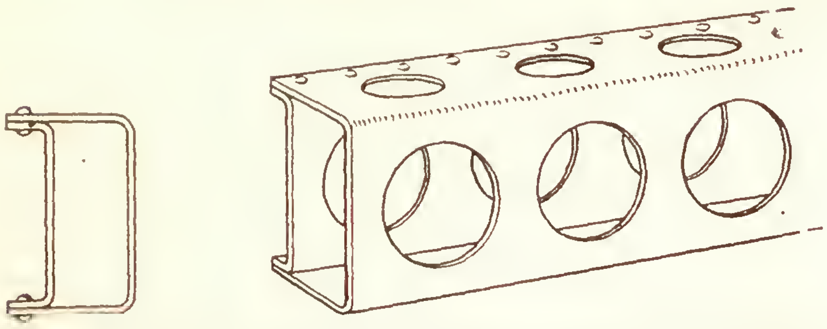

Fig. 4: Built-up steel box struts of the type used in the Dyle et Bacalan DB 10.

found to be very satisfactory from the point of view of vibration. In many cases there is evidence of considerable elaboration of the joints, possibly due to difficulties which have been experienced in this direction. In the case of the Fiat, square section tubes of very light gauge are used, a form that is expensive and necessitates elaborate jointing.

Some very fine examples of die castings in the light alloy, marketed under the name of "Alugir," which appears to be of the type of "Y" alloy (4 per cent. copper, 2 per cent. nickel, and 1½ per cent. magnesium) are shown. The company exhibiting these (*Etablissements Metallurgiques de la Gironde*) confine their foundry operations in this class of material to die castings, with the exception that in certain cases sand cores are used for pistons. The die casting in this class of material, judging from characteristic prices of work exhibited, has been brought to a very economical stage of manufacture, both as regards the dies and the articles themselves. Many of the parts exhibited were for railway work, but die casting is useful in aeronautical work, and with light alloys in particular there is no doubt that there is a very substantial gulf separating die castings from sand castings as a satisfactory engineering product, principally due, I think, to the chilling. Castings in materials of this type can be heat-treated and give very favourable mechanical properties. Some equally good examples of drop forgings are also to be seen made from this material, whilst it is stated by the stampers to be slightly more plastic at forging temperatures than the duralumin class; but there does not seem to be anything to choose between the appearance of the finished products in either class of material. On the duralumin stand, besides the remarkable exhibit of taper strip, there are some very large examples of solid-drawn tube work, which would seem to indicate that the French company must cast very large ingots. There are also some fine examples of forgings for propellers (see Fig. 6). Given the possibility of obtaining forgings of this type at a reasonable price—and the figures quoted were certainly quite commercial—the problem of the metal propeller resolves itself really into one of machine generating, which is by no means new and certainly not insoluble. The examples of propellers machined from these forgings were not very good from an aerodynamic point of view, nor, except for the show exhibits on the Duralumin stand, did they appear to be very well machined. The prices stated for machining operations were, however, very low, and it would seem that the development of satisfactory propellers on these lines cannot be very far distant. The machining on these propellers was, I believe, carried out by a copying operation from a wooden former, which seems a less satisfactory operation than the use of a proper generating machine. An extraordinarily large propeller forging was also shown on the Duralumin Company's stand, but a superficial examination led one to the conclusion that the boss was not entirely sound.

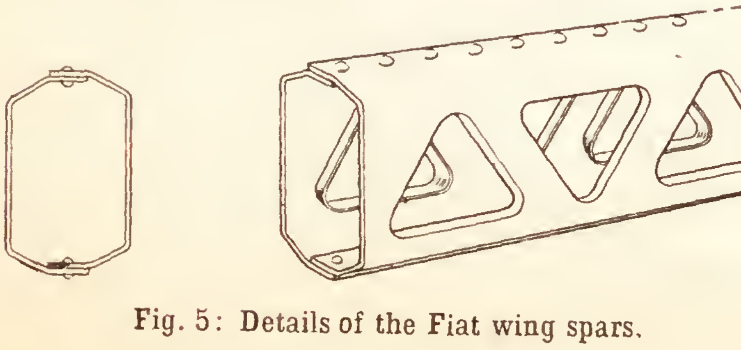

Fig. 5: Details of the Fiat wing spars.

It is, of course, quite natural that difficulties should be experienced with such very large forgings, even though smaller propellers required for ordinary aircraft are quite satisfactory.

In the matter of engine installation, particular interest naturally attaches to the installation of the "Jupiter" engine, of which there were very many examples. It is interesting to note that no machines were shown fitted with helmets although the rudimentary fairings on the Gourdou Leseurre are probably a token of that firm's earlier interest in helmeted cowling. Much of the cowl work seemed very flimsy and awkward to remove, and one would expect difficulties of maintenance in service, this is the more disappointing as French cowl work is usually so neat.

A very bold and simple arrangement is to be found on the Fokker stand where, by making use of a spinner on the propeller, the cowling is reduced to 9 plates, one between each cylinder, of 18 gauge thickness, not beaded in any way but lightly creased to give stiffness. Each of these plates sits on four bosses and is secured from jumping off the boss by a safety pin. This type of cowling fixing has, of course, been used by Fokker for some time, and even if it is rather shocking from an engineering point of view, would seem eminently practicable if it stands up to service.

These criticisms have been written some time after a visit to the Show, and without making any notes and without attempting to notice either everything that is good or everything that is bad. They are merely an endeavour to set out for the information of others those points which appealed to me personally as an aeronautical engineer. The great advantage of exhibitions is that they make one think, since owing to the unfortunate secrecy which surrounds aircraft work due to its military nature, there is a grave danger of sections of the aeronautical community, if not individuals, becoming self-centred. Where the work of others is exhibited for our inspection and interest, we must always realise that some of the things we fail to appreciate, we may not understand. If we have a difficulty in reconciling, in the light of our experience, the costs of the manufacture of various types of metal construction with the work involved therein, and if we find a difficulty in understanding how machines of certain aerodynamical features give certain performances we ought to remember that one explanation may be that individually each of us still has a lot to learn.

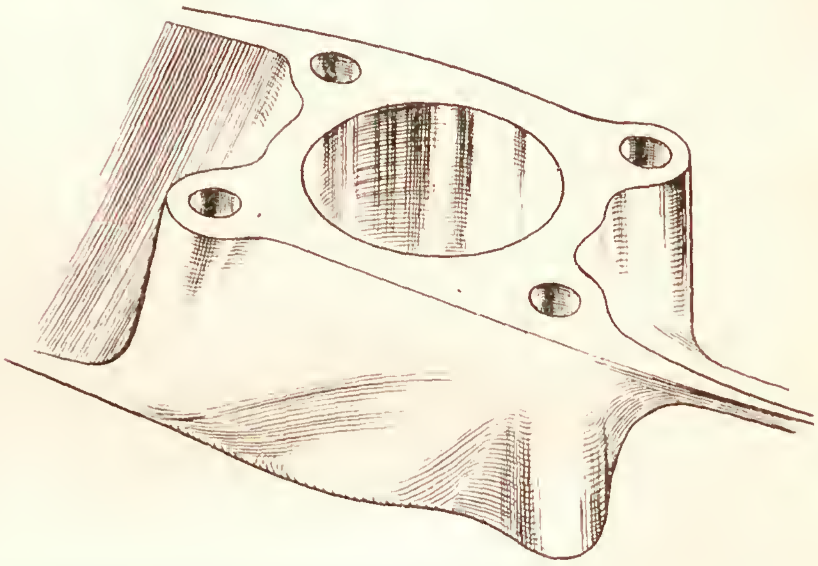

Fig. 6: Boss of forged Duralumin propeller, Comte patent.

TENDENCIES OF DESIGN AT THE PARIS SHOW.

By F. M. GREEN, M.Inst.C.E., F.R.Ae.S.

To my mind, the outstanding thing about an exhibition of aeroplanes is the tendency of almost everyone to judge the exhibits from one point of view only, which is "cleanness of design." We all know that the power taken by an aeroplane is made up of two parts—one dependent on resistance, the other on weight. It is the constant endeavour of the designer to decrease both. Unfortunately decreasing resistance has a strong tendency to increase weight, to say nothing of accessibility. At a show it is so easy to say that such an aeroplane is a very clean job, but much more difficult to say whether it is a light or heavy job or whether, which is still more important, it is a strong and practical job for its weight. I do not mean that an aeroplane ought not to look well faired off, but that this quality must not be obtained at too great an expense in other qualities.

Greater attention to reduction of resistance is undoubtedly a tendency in design, though it is to be noted that wing surface radiators are entirely absent. There seems little doubt that in spite of the big saving in resistance that they make possible, weight and certain practical considerations have led to their disuse. There are many instances of aeroplanes beautifully faired, with large areas of sheet aluminium or duralumin. Beautiful as they look on a Show stand, they seem to me to be exaggerating one quality at the expense of weight and practicalness, and I expect to see a return to simpler design.

There is one very marked difference between continental design and our own, and this is in the travel of the landing gear. In England we have settled down to using a travel of 8 ins. to 10 ins., and to providing some sort of damping, usually by oil displacement. The average continental aeroplane has certainly not more than 3 ins. of this movement, almost always resisted by tensions rubber without other damping. It is obvious that the longer the travel the less is the shock to the machine in a bad landing, so either our neighbours must land much better than we do, or else they must make stronger frames and landing gear if they get the same life out of their machines as we do. I do not think our pilots are inferior in skill, but it is not unlikely that the size of the aerodrome has an influence. There is generally more room on the Continent, and the pilots take advantage of this to fly their aeroplanes on to the ground and avoid stalled landings. How they get on with tension rubber shock absorbers in tropical countries I do not know. Another thing that confirms the view that little attention is paid to flying and landing slowly, is the small size of the control surfaces. These are smaller all round than is the practice in this country, and the angular travel is distinctly less. At a rough average it looks as if all the controls are less than two-thirds as powerful compared with our own aircraft. Rudders are still very much on the small side, though they have shown a slight tendency to increase, and adjustable tail planes are almost entirely absent.

There is one curious result of the use of short travel landing gear. It has encouraged the design of wheels with large diameter hubs in which is a sliding mechanism with rubber shock absorbers. This allows the axle to be fixed, as in the Breguet XIX. In this aeroplane the designer has made full use of the fixed axle by attaching the main lift wires to it. This increases the effective depth of the structure of the wings, and reduces the end load in the spars considerably. Whether or not it is advisable to take the main bracing of the wings through the under-carriage is open to question, but there is no doubt that it helps to lighten the structure. Other designers have adopted the principle of the fixed axle but have not taken advantage of it in the same way.

There is no doubt that metal construction is becoming more and more popular. The French constructors use an aluminium alloy almost exclusively, generally duralumin. France is a great aluminium producing country and in time of war would have no difficulty in finding supplies, and no doubt this has an important influence. There is another and, I think, important factor that influences French design in one way and our English design in an opposite way. France is a compact nation without much responsibility abroad. The British Empire is world-wide. French aircraft are chiefly for use in or near to France and are never likely to be far from an organised aircraft factory. English aircraft are flown in countries where the users can only depend on themselves for upkeep. The result of these opposite requirements is that French aeroplane designers are not much troubled with questions of upkeep and repair and they have developed a construction which can be made only by specialised manufacturing methods. They prefer to replace rather than to repair. I think we can go even further than this and say that a French aeroplane is only expected to have a comparatively short life, even in peace time. I could find no attempt at protecting aluminium alloy from corrosion, even when in close contact with steel. Either our own authorities are unduly cautious or else deterioration with age is not considered.

In the actual use of material in construction there seems little or no advance since the Paris Show of two years ago. Then, as now, the Breguet XIX was the principal exhibit, and this appears to be unchanged. I certainly think that the Breguet spars could have been designed to have fewer pieces in them, but as their manufacture is in quite large quantities, manufacturing method make up for what seems to be unnecessary complication.

An example of Italian construction is the Fiat single-seater scout. This is in steel, with the exception of the ribs, which are of light alloy. While there is much to admire in the construction, the spars are of a design which does not look good for a stress of much more than 25 tons per square inch, and which does not appear to be particularly easy to make.

Light alloy petrol tanks are increasing and are now made without welding or solder in most designs. I believe that some form of jointing material is used, but I could not find out how permanent it is likely to be.

I found no novelties in aerodynamic design. Most machines are biplanes and not a few of the monoplanes have so many struts that they would almost certainly have gained by having a lower plane. There is a marked absence of balance for control surfaces, even in the larger machines. Ailerons are frequently long and very narrow; rudders and tail planes are almost always inadequate according to English ideas, and this is probably the result of larger aerodromes and faster landings. Fuselages seem to be getting bigger in cross section than is strictly necessary, and in certain instances seriously affect the pilot's view. There are no helicopters, nor even an autogyro, neither is there any use of wing slots or slotted controls. Wing sections are on the whole rather thicker, though not very noticeably so.

These few notes are not meant to be a review of the Paris Show. They are rather a personal record of tendencies, and an attempt to explain differences in development on the Continent and at home. If it seemed to me that two years had not brought much progress it must be remembered that two years is a very short time, and that there are no doubt more detail improvements, which are not very obvious, than I have space to describe.

AIRCRAFT AT THE PARIS SHOW.

(*See double centre-page table.*)

In this week's issue of The Aircraft Engineer we publish a table giving such characteristics as were available of the machines exhibited at the Paris Aero Show which closed its doors recently. In the main the table is self-explanatory, at any rate as regards that part of it dealing with dimensions and weights of the machines. The performance figures, too, are the usual. In order, however, to facilitate comparison of the merits of the various machines we have included in the table certain descriptive figures which are not usually given in English aircraft specifications. These are the "Everling Quantities," for a detailed explanation of which we would refer our readers to the last issue of The Aircraft Engineer (November 25, 1926, pp. 95 to 99). The three special columns are those giving "wing-power," "high-speed figure," and "altitude figure." In addition, we have included a column giving the "span loading," or $\frac{\text{span}^2}{W}$. This latter is not an "Everling Quantity," but is a figure very useful in performance calculations for the estimate of induced drag. (*See* "Aircraft Performance," by J. D. North, The Aircraft Engineer, April 29, 1926, pp. 40 to 43.)

Although we regard the table as being very useful for purposes of comparison, we would point out that too much importance should not be attached to the "Everling Quantities," not because these are not in themselves reliable, but for the simple reason that, in the case of the present table, the manner of deriving them is not altogether above reproach. For the quantities to be strictly reliable it would be necessary to know the exact power developed by the engines at the performance to which the quantities refer, and also the propeller efficiency, although the latter could probably be estimated with a fair degree of accuracy. What we have perforce had to do in compiling the table is to use the nominal horse-power of the engines, and in certain cases this may, and in all probability does, differ very materially from the actual power. Consequently the "Everling Quantities" thus derived are not comparable with others based upon the actual horse-power. It is thought, however, that in the case of the Paris show machines, where mostly engines of the same make and type are used, the table may afford a reasonably good comparison, since even if the power of any one type of engine differs considerably from the actual power, the same figure is used for several machines fitted with that engine. Thus a comparison between machines fitted with a given type of engine should be fairly accurately comparable.

Referring to the table of data, it is found that the highest value of "wing power" is attained in the Nieuport-Delage 48 C.1, which has a power of 20·6 h.p./sq. m., or 1·91 h.p./sq. ft. of wing surface. In other words, it is a powerful machine with small wing area. Second comes the Bernard sesquiplane with a "wing power" of 20·4 h.p. sq. m. (1·90 h.p./sq. ft.). Actually it seems possible that other machines may have as high figures because of their engines being of much greater power than the rated or nominal power.

The highest value of "span square divided by weight" is reached by the little Caudron parasol monoplane with 40 h.p. Salmson engine, the figure for which reaches the high value of 1·16. As the average value of this figure is around 0·5 or 0·6, it will be seen that the induced drag of the Caudron parasol should be very low. On the other hand, such high values are only practicable in relatively slow machines.

Turning to the column of "high-speed figures," it is found that here the highest value (34·5) is attained by the Bleriot-Spad 61. A word of warning might not, however, be out of place here, as this machine provides a very good example of the somewhat doubtful procedure of taking as a basis the nominal power of the engines. In the case of the Spad 61, the rated power of the Lorraine engine is 450 h.p., but it must be realised that the engine in this particular machine was fitted with a supercharger, so that the power would be much greater or rather the power would be developed at altitudes. Actually, we understand that the top speed claimed (283 km./h.) is attained at 5,000 m. This would have its effect upon the "high-speed figure."

Other excellent "high-speed figures" are attained by the Farman night bomber (23·0), the S.E.C.M. commercial monoplane and the Nieuport-Delage 42 C.1 (22·0).

As regards the "altitude figure," two of the best machines in this respect, *i.e.*, the Spad 61 (world's altitude record holder) and the Potez G.R. 28, have figures falling right outside the graph of Professor Everling published in our November 25 issue. Of the two the Potez is farther outside the limits of the graph than is the Spad, which rather seems to indicate that the Potez is the more efficient (in this respect) of the two. On account of the use of nominal power, however, it is almost impossible to decide definitely. There can be no doubt that both are very good as regards ceiling. In the case of the Potez it is, of course, not so much the actual altitude as the ceiling with a very heavy load which gives the machine such an excellent "altitude figure."

From the table one machine appears to stand out as a particularly efficient aeroplane. This is the Czechoslovak Aero Ab. 11 with 240 h.p. "Perun" engine. In spite of its low power, this machine has a good top speed and a high ceiling. The result is reflected in the columns giving "high-speed figures" and "altitude figures." The former is as high as 27 and the latter 9·4. Both are excellent, and here is a machine about which there is very little doubt. The engine normally develops the rated 240 h.p. at 1,400 r.p.m. It is, however, of the high-compression type and is claimed to maintain its power up to an altitude of 10,000 ft. This fact doubtless has an important bearing upon the ceiling of the machine.

Finally, it should be pointed out that in the column headed $\frac{\text{span}^2}{W}$ the figures given are for British units, *i.e.*, span in feet and weight in pounds. The "Everling Quantities," on the other hand, are in metric units, this being necessary because the original Everling figures were in metric units, as were also the nomographs employed for reading off the figures. In any case it is considered advisable to retain the metric units for the "Everling Quantities" so as to facilitate comparison, for which purpose a uniform system of units is necessary.

TECHNICAL LITERATURE.

AERONAUTICAL RESEARCH COMMITTEE REPORTS.

EXPERIMENTS RELATING TO THE ELECTRIFICATION OF BALLOON FABRICS.

By GUY BARR, B.A., D.Sc.

R. & M. No. 1017. (M. 37.) (10 pages.) June, 1926.
Price 9*d.* net.

The experiments described in this paper arose from a discussion on lightning risks in airships. They were undertaken :—

(1) To find a method of making the surface of balloon fabrics conducting.

(2) To investigate the electrification produced by the ripping of rubbered fabrics.

Samples of various fabrics sprayed by the Schoop method with metallic aluminium and with zinc, have been examined, particularly with reference to the permanence of the conducting layer. Alternative methods of producing a conducting surface have been tried, and the conductivities of a number of materials representing current practice have been measured.

Two- and three-ply rubbered balloon fabrics have been separated into plies and also broken as a whole in an apparatus permitting examination of the resultant charge, and also in an atmosphere of hydrogen and air.

Spraying with metal gives a layer of low electrical resistance (3—7 ohms per cm.^{2}) at the cost of an increase in weight of 4 oz/sq. yd. or more ; the resistance is liable to increase if the material is crumpled, but falls to a low value if a potential of 10-100 volts is applied. If the coating is impregnated with dope, this recovery eventually becomes impossible. Fabric doped on the upper surface after having been sprayed on the under surface was satisfactorily conducting after five months' exposure.

The most satisfactory treatment so far discovered, involving only small increases in weight, consists in the application of graphite in the form of an Aquadag suspension. A weight of some 3 grms./sq. metre gave a resistance of 0·03 to 2 megohms/cm.^{2}, which was not much increased by doping, and with a weight of 4 or 5 grms./m.^{2} a resistance of 3,000 ohms/cm.^{2} was obtained after doping.

When the plies of a rubber-proofed two-ply fabric are rapidly separated, the cotton surface left bare becomes positively changed, the rubber attached to the other ply being negatively changed. The extent of electrification varied in different experiments, the maximum observed being of the order of 4,000 e.s.u. per square metre of separation.

It is suggested that the graphitisation of the fabric be studied more closely ; exposure tests should be made on the coating already obtained, and experiments made to see if the conductivity can be further improved.

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LONDON AUSTRALIA AND BACK.	For this flight of 26,000 miles, Sir Alan Cobham's machine was a	D.H. 50J SEAPLANE: Engine: Armstrong Siddeley Jaguar.
THE KING'S CUP RACE.	Won by Capt. H. S. Broad, A.F.C., flying for Sir Charles C. Wakefield, on a standard	D. H. MOTH: Engine: Mark I "Cirrus."
LONDON BAGHDAD by Light 'Plane.	Messrs. T. Neville Stack and Bernard Leete have flown to Baghdad on two	D.H. MOTHS: Engines, Mark II "Cirrus."
CAIRO KARACHI AIR LINE.	For the new passenger and mail service, Imperial Airways Ltd. are using	D.H. HERCULES: Engines: 3 Bristol "Jupiter."

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Considerable improvements continue to be made in the development of the all-metal airscrew for aircraft, and we have just received particulars of the latest efforts in this direction from the pioneer aircraft constructing firm of Short Bros., of Rochester and Bedford.

The "Short" metal airscrew, which has recently undergone flying tests with most gratifying results, has been developed by the firm to meet the demand for a metal airscrew, giving the increased efficiency that is characteristic of the thin sectioned type duralumin blade, with a system of construction that is both simple and cheap to produce, and durable in service.

The most important feature of the "Short" metal airscrew is the separate construction of the blades, which are interlocked together at the boss on the well-known halved-joint principle.

The advantages of this construction are several, as for instance, the detachability and easy replacement of a blade in the event of damage, the cutting of the blank with the minimum wastage of material, and the small size when dismantled and packed for transport, as will be appreciated by a reference to one of the accompanying illustrations.

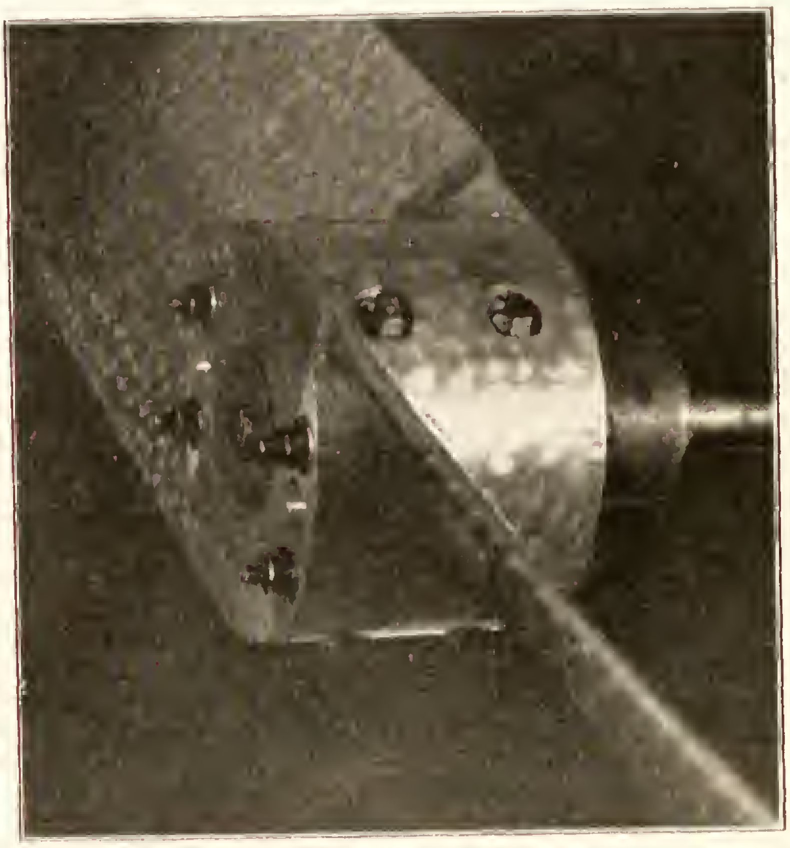
Moreover, with this system of construction the four-bladed type of airscrew is a practical proposition, the blades being joined at the boss in a similar manner to the two-bladed type. The advantages of detachable blades for transport are all the more apparent when four-bladed screws are employed. This type is in fact, now being developed and a design is being prepared.

The blades of the "Short" metal airscrew are formed in a similar manner to that adopted in the construction of duralumin airscrews, now being extensively used in this country and abroad, that is to say, the cutting of the blade from a duralumin slab to a plan-form tapering towards the tip, milling all over to the correct section, and finally twisting the blade to the desired pitch angles. It is obvious that the operation is simplified in the "Short" system of joining the blades at the boss at a considerable angle to each other. Moreover, in avoiding a sudden change in the angle at the root of the blade that is necessary in the single unit type, the stresses at the point are considerably relieved, resulting in a more uniform load with consequently less likelihood of change in pitch of the blade under air load.

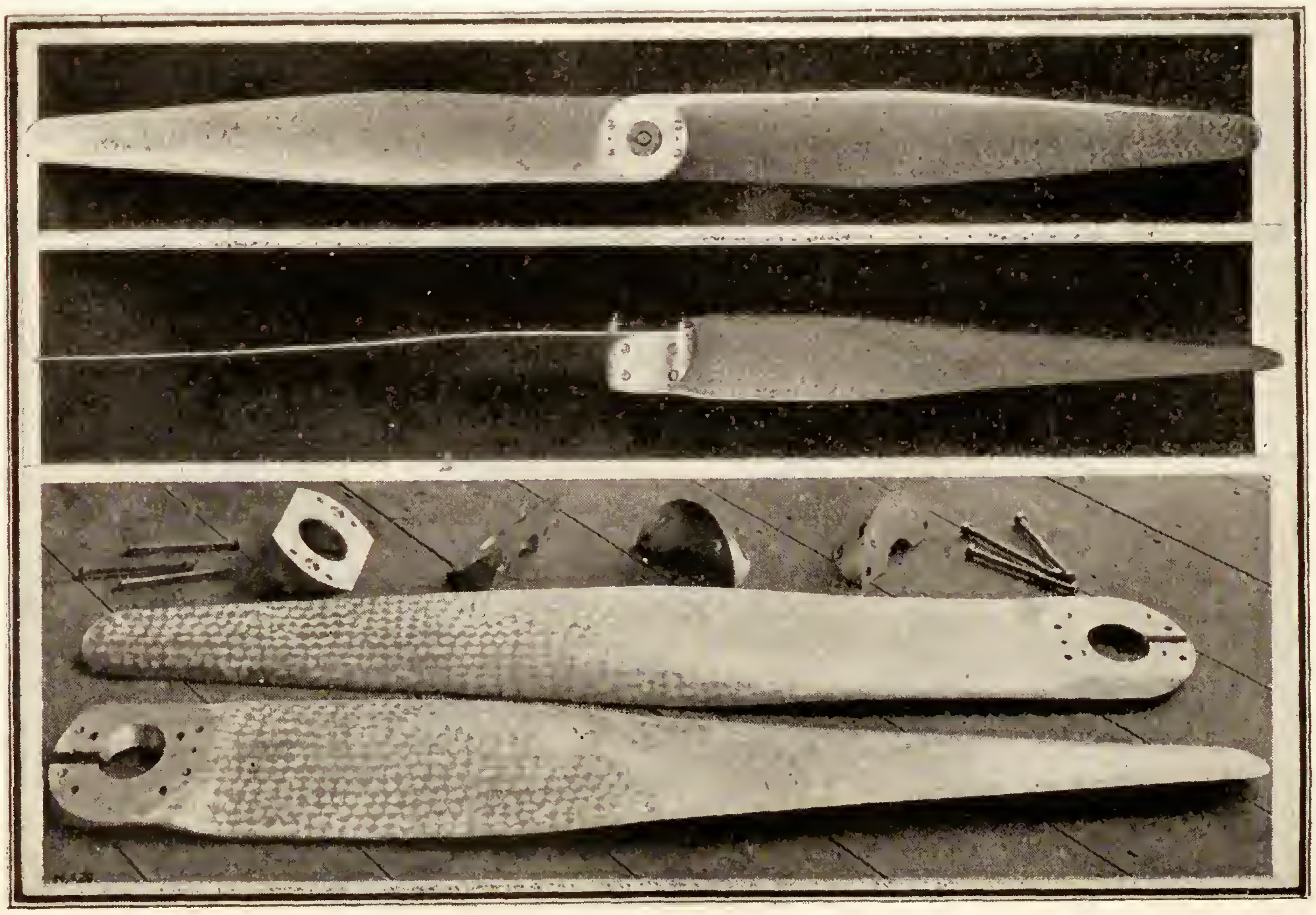
The method of joining the blades and the boss construction is clearly shown in the accompanying photograph.

As will be seen, each blade at its inner end has a central longitudinal notch enabling it to engage, at approximately a right angle with its oppositely extending companion blade, the two blades being then interlocked on the halved-joint principal.

The angular spaces between the blades at the point of the junction are filled by solid blocks of Duralumin or other suitable material of corresponding angularity so shaped



THE SHORT ALL-METAL AIRSCREW: A detailed view of the assembled hub.



THE SHORT ALL-METAL AIRSCREW: The two upper illustrations show the complete airscrew, front and side views. Below it is seen dismantled, showing the various component parts.

externally as to constitute—when assembled with the blades—the hub or boss of the airscrew, the whole assembly being then drilled as a unit and rigidly locked together by bolts, as is clearly illustrated in the detail photograph of the boss.

The flying tests carried out with this airscrew, fitted to the Short "Mussel" seaplane with "Cirrus" engine, have been more than satisfactory in every way, not only is there an improvement in top speed to the extent of 3 m.p.h. compared with the results obtained with the best of several wooden propellers, but the same falling-off in efficiency at slow forward speeds that is characteristic of other airscrews of this type, has not appeared.

It appears that the increase in efficiency has been maintained over the whole of the range of forward speeds, in fact, the machine will, when fitted with the metal airscrew get off in a dead calm with 70 lb. more load than with any wooden airscrew yet fitted. The climb shows a similar improvement, and, on test, pilot reports no undue vibration. Furthermore, no ill effects from water thrown up with the floats have appeared.

RUGBY FOOTBALL

Napier's Rugby Football Club beat the Rugby team of B.T.-H. by two goals and one try (13 points) to love at the Napier ground at Acton on Saturday, December 18.

The ground was in good condition, but there was a cold wind blowing, which seemed to chill the outsides when the ball did not come their way. Probably it also interfered with the passing of the outsides, which was never very brilliant, though the B.T.-H. three-quarters were the more accurate in handling. They were not, however, able to break through the resolute defence of the Napier team, though Wallace always looked dangerous when he had the ball, and, being tall and a strong runner, was not easy to tackle. He put in a number of very good runs, but his movements never ended in a score. For the Napier team Burns at fly-half was in a class by himself, both in defence and attack, in addition to which he kicked two goals from tries, the second one a beauty from a difficult angle and in badly failing light. One fault common to nearly all the backs on both sides was an inability to find touch when they punted. Often they did not even try to do so, but merely kicked ahead and hoped for the best.

The game consequently developed into a series of loose rushes by the two packs of forwards in turn, and both packs showed considerable skill in keeping the ball at their toes, making good pace, and eluding the heroic defenders, who resolutely threw themselves in the path. For one period in the second half there was no regular scrum formed for about 15 minutes, while the forwards rushed the ball to and fro.

At the kick-off B.T.-H. got down into the Napier ground, but were speedily driven back. The Napier three-quarters were given a good opening by their halves, but a dropped pass stopped the movement. The Napier forwards pressed hard, and, as a result, Mark, the scrum half, dived over for a try, which was not converted. B.T.-H. then had a spell of attacking, but spoiled their first chance by kicking over the line. They came back again, however, and there was a series of hard-fought scrums on the Napier line. Napiers then did a very daring thing. Getting the ball in the scrum they actually heeled, and Mark coolly passed back over his own line to Burns, who touched down. It seemed about this time that B.T.-H. must score, but finally they drove themselves back by kicking over the line once and again.

Napiers had their turn of attacking, but Wallace relieved with a real good jinking run. Napiers got the ball out to their right wing, and Hutchinson cut through in excellent style and scored a try which Burns converted.

Towards the end of the game Napiers asserted clear superiority, Warner put in a very good run, and a little later Harvey dribbled down to the B.T.-H. line and Warner took the ball over, but was whistled back for a knock on at an early stage of the movement. The Napier full back soon after damaged a knee, a joint which has given him trouble before, and had to be carried off the field. Burns took his place, and this should have weakened the Napier attack. Their forwards, however, took matters into their own hands, and after a series of hot rushes Robson-Elgee scrambled over in the corner. Burns's kick, which added the full points, was, as already stated, a beauty.

Teams.—*Napiers*: P. Foulds (captain), full back.

H. W. Whymper, A. K. Harvey, A. P. Wright, and R. H. Hutchinson, three-quarters.

R. H. W. Mark and D. S. Burns, half-backs.

G. Pate, C. Robson-Elgee, G. E. Young, H. J. S. Rowe, S. Pearson, A. E. Benson, J. Furness, and A. G. Warner, forwards.

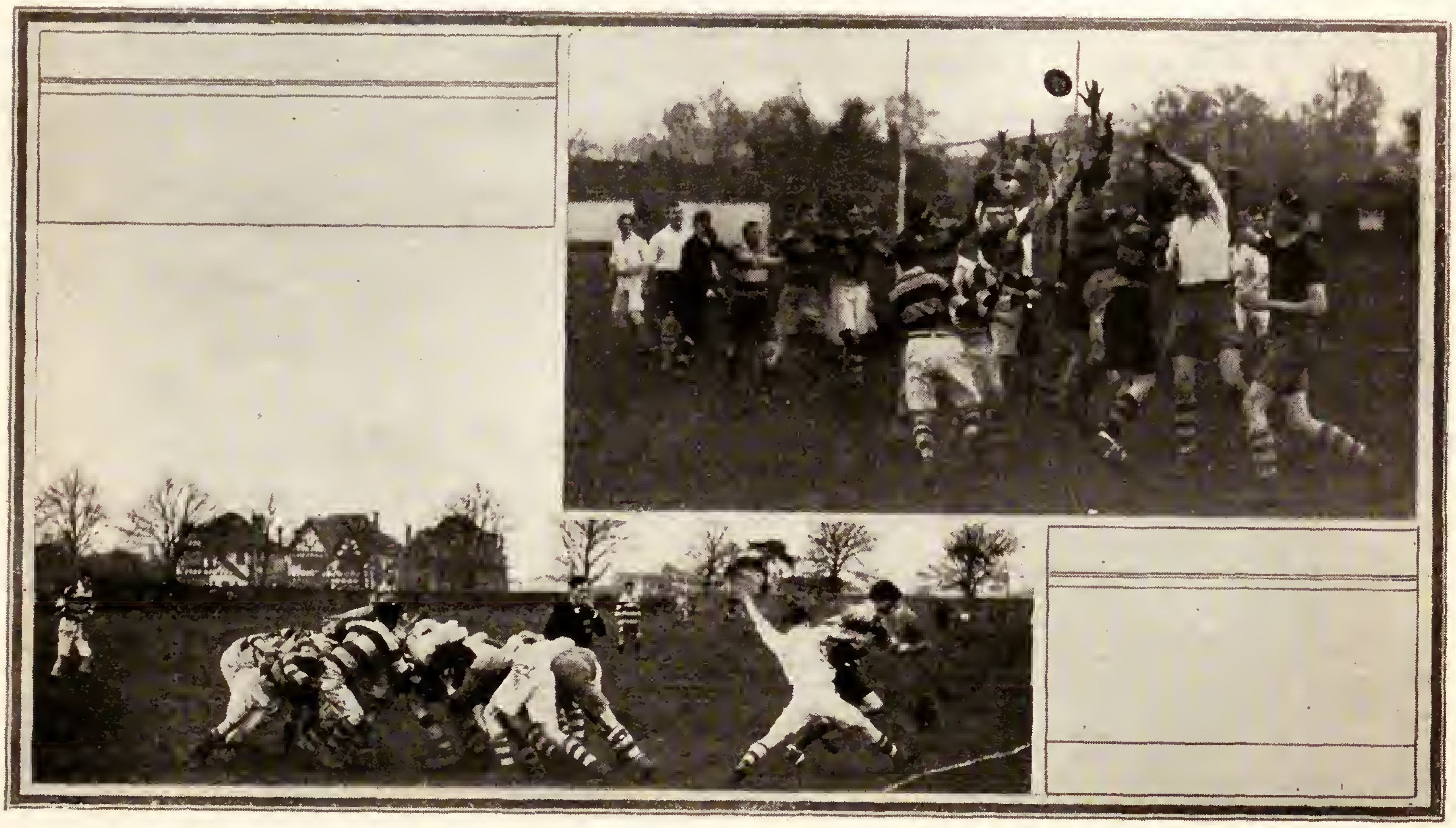
B.T.-H.: A. H. Cash (captain), full back.

E. A. Lennox, C. C. Wallace, G. W. Rowlatt, and E. G. Mackie, three-quarters.

W. H. Mann and Eiloart, half-backs.

C. J. Higgins, J. W. Seaton, C. F. Humphreys, B. F. Dobson, A. Mackay, E. R. Smith, E. Mowbray, and G. Hastings, forwards.

F. A. de V. R.



NAPIER v. B.T.-H. RUGGER MATCH: Top, a Line-out near Napier's goal. Bottom, a Scrum in B.T.-H. Territory.

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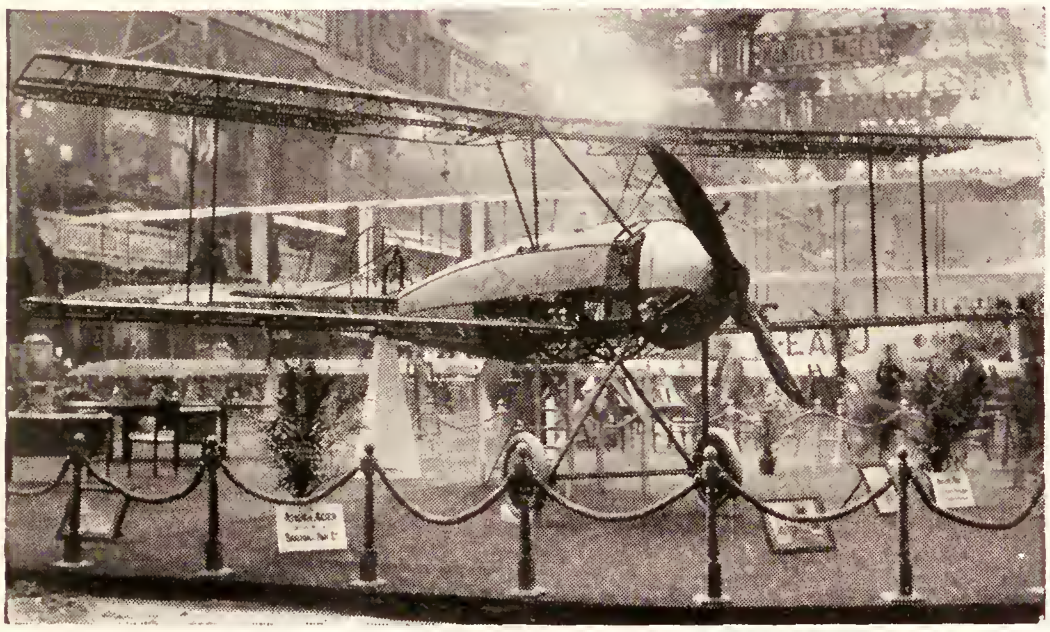
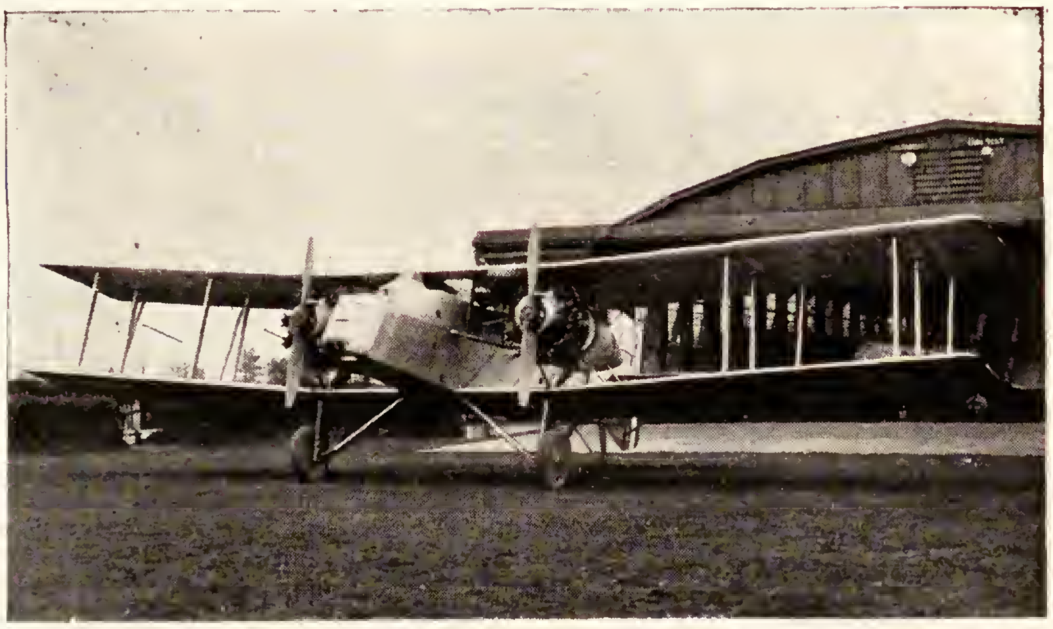


1919

THE Boulton & Paul P.10 Aeroplane, exhibited at the 1919 Paris Show, was the first complete example of modern all-metal construction to be introduced to the public. It compared on very favourable terms with contemporary wooden machines. Developments since that date have consisted not merely in the incorporation of these methods of construction in new types of aeroplanes. In the evolution of new and better constructional features, in the application of constant aerodynamical research to body and wing forms, in the employment of new and better materials, in the improvement of methods of control, in the introduction of safe protective coatings—in these and many other ways, Boulton & Paul aircraft embody not only experience but PROGRESS.



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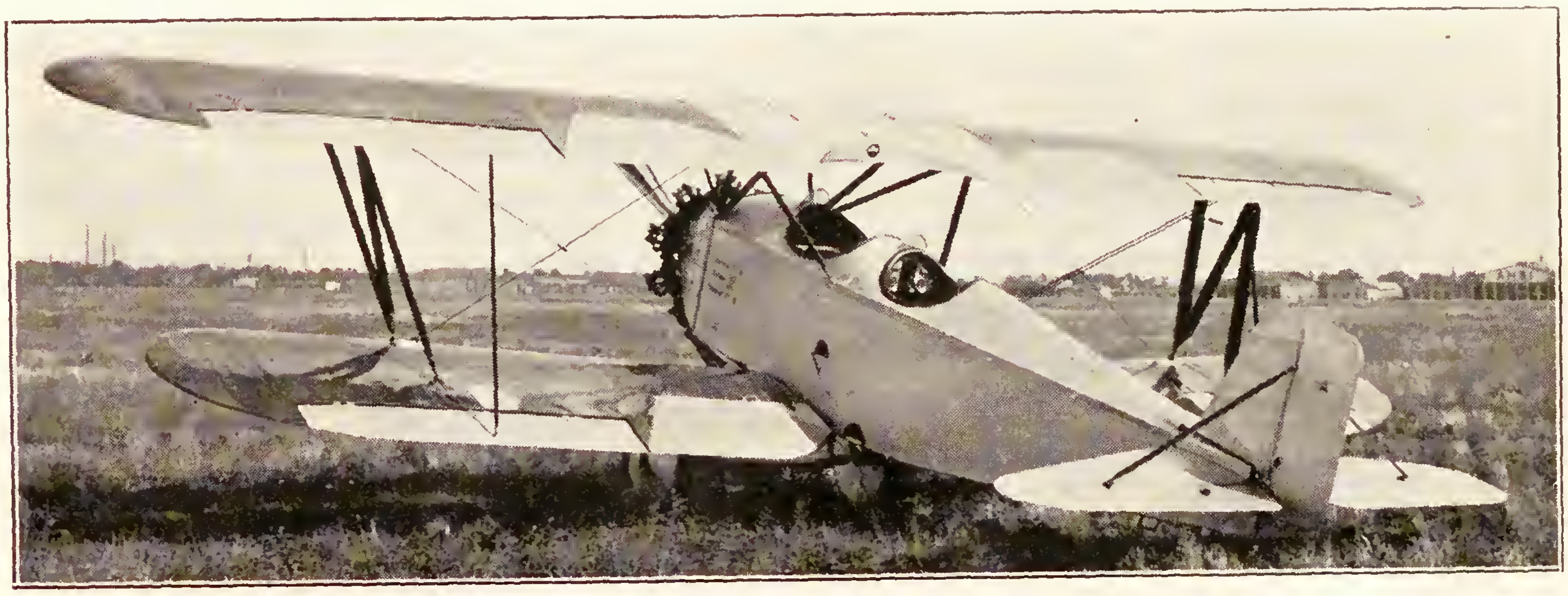
THE ALBATROS L.68A SCHOOL MACHINE

100 H.P. Siemens Radial Air-Cooled Engine

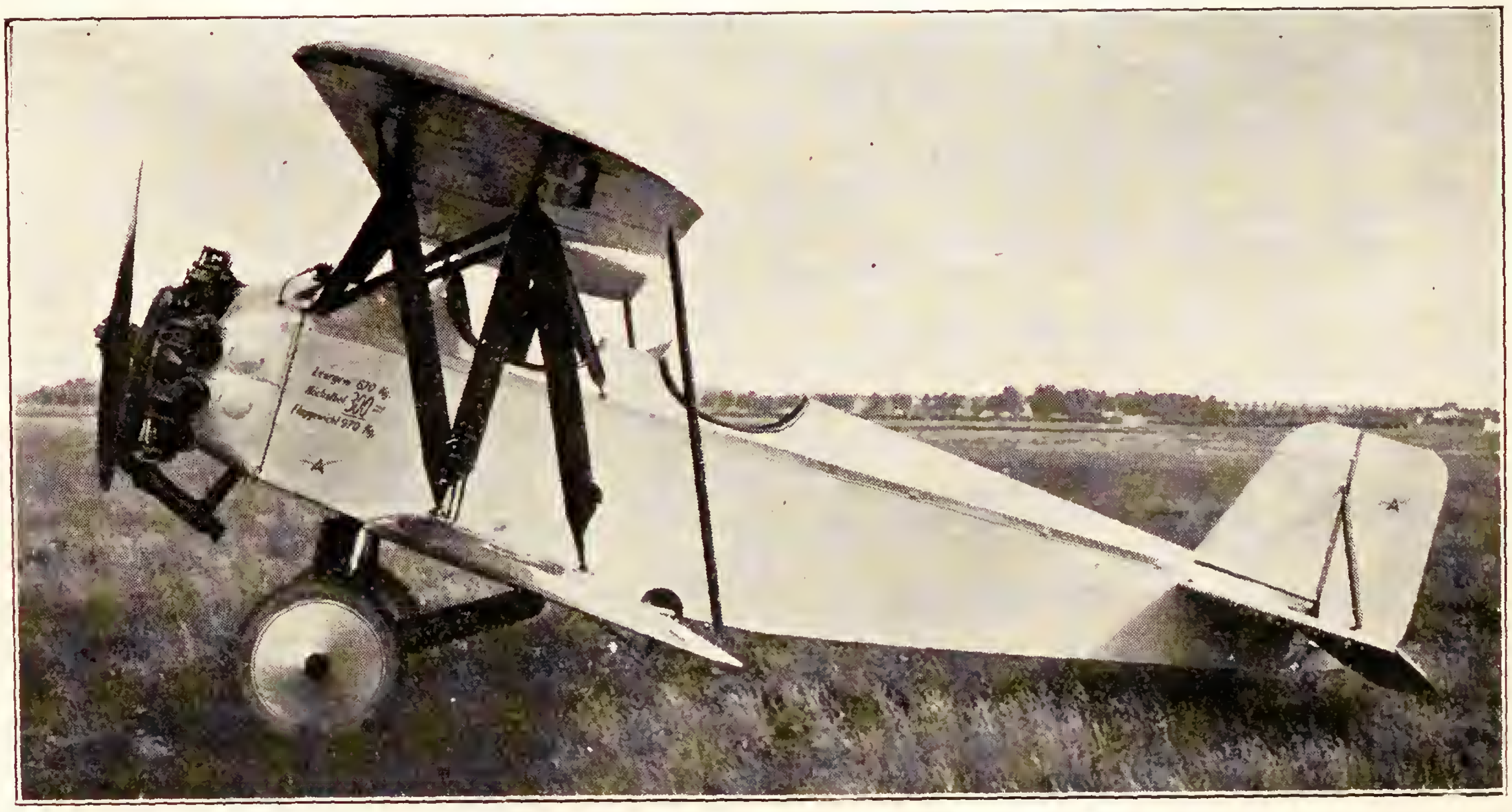
THE Albatros L.68A illustrated in the accompanying photographs has been designed and constructed by the Albatros Aircraft Works, Ltd., of Johannisthal, Berlin, as a result of their experience with an earlier type of similar lines, the L.68. The new machine, whose series number is L.68A, is intended for school work and for sporting and demonstration flying. In order to fit it for the latter, it has been designed with rather higher factors of safety than usual.



THE ALBATROS L.68a : Three-quarter rear view. The wings are mainly planked with three-ply, although trailing edge and flaps are fabric covered. The ailerons incorporate the Handley Page -Lachmann slot.

The L.68a is, it will be seen, characterized by a fairly heavy stagger of its biplane cellule, and as regards its lines looks singularly "un-German," resembling much more a British machine in its general layout. It is a rather curious fact that of recent years there appears to have been in Germany a reversal to the biplane type, which once upon a time was far less popular than the monoplane, but which again seems to be coming into its own for smaller machines. Large German aircraft is still almost entirely of the monoplane type. There can probably be no gainsaying the fact that weight for weight the biplane structure is superior to the monoplane from a strength point of view, and even aerodynamically it is very doubtful whether the monoplane, and particularly the cantilever monoplane, is really as efficient as its apparently "clean" lines might lead one to suppose.

In the Albatros L.68A Herr Schubert, the Albatros chief designer, has been content to follow orthodox lines, and the machine presents no unusual features aerodynamically if we except the fitting of slot-ailerons. In connection with these it should be noted that the ailerons do not extend right out to the rounded wing tips, but stop short approximately where the wing tip curve merges into the straight trailing edge. At the inner end also, the ailerons do not run right up to the fuselage (in the case of the bottom wing), nor to the top centre-section, but are altogether of relatively short length, and, it would seem, to some extent inefficiently placed in that their already short span may be rendered less effective by so placing them that they work on a relatively short lever arm. However, so far as we know the machine has very good lateral control, so that presumably the extra effectiveness of the slots makes up for the short distance of the lateral centre of pressure from the centre line of the machine.



THE ALBATROS L.68a : Side View. The engine is a 100 h.p. Siemens radial.

The Albatros L.68a is of "mixed" construction in that the wings are of all-wood construction, while the fuselage is a steel-tube structure covered with fabric. In section the fuselage is of the flat-sided variety, but with a slightly cambered deck. The tail members are also of metal construction, the structure members being arranged to give triangulation. The tail plane is of the trimming type, its rear spar being braced by struts to the fin, and the front spar being elevated or depressed for trimming. The tail skid, it might be pointed out, is so mounted as to steer with the rudder in order to make the machine easy to taxy in a wind.

The wing structure, as already mentioned, is of all-wood construction, the planking being in the form of three-ply, which extends from the leading edge up to the false spars carrying the ailerons. Near the fuselage and top centre-section, however, the three-ply planking only extends to the main rear spar, the remaining portion aft to the trailing edge being fabric covered, presumably in order to save weight. Streamline steel tube interplane struts with incidence adjustment are arranged in the form of a letter N, and top and bottom ailerons are connected by a strut on each side. The top centre-section is of fairly large span, and is swelled to accommodate the gravity petrol tank. The trailing edge of the centre-section is cut away to the rear spar, and the petrol level indicator is mounted on the rear face of the spar where it can be read from both cockpits.

The undercarriage is of simple Vee type, with rubber rings in compression forming the shock absorbers in the telescopic front legs. There is an oleo dashpot arrangement for checking bouncing.

The 100 h.p. Siemens radial air-cooled engine is mounted on a swivelling engine plate, which gives easy access to the back of the engine. The petrol feed is, as already stated, by direct gravity flow from the tank in the top centre-section. This tank has a capacity sufficient for four hours' flying.

As regards the two cockpits it may be mentioned that these are of generous proportions, and allow of the occupants employing, if they wish, parachutes of the pack type. The seats of both cockpits are adjustable.

Following are the main dimensions, weights and performances of the Albatros L.68a:—Length o.a., 6·3 m. (20 ft. 9 ins.); span top plane, 10·1 m. (33 ft. 2 ins.); span, bottom plane, 9·05 m. (29 ft. 9 ins.) ; wing area, 24·4 m.^{2} (263 sq. ft.). Weight of machine empty, 655 kg. (1,440 lbs.); useful load: pilot and passenger, 1760 kg. (352 lbs.); petrol, 100 kg. (220 lbs.); oil 15 kg. (33 lbs.); disposable load, 25 kg. (55 lbs.); total useful load 300 kg. (660 lbs.); total loaded weight, 955 kg. (2,100 lbs.). Wing loading, 39·8 kg./m^2. (8 lbs./sq. ft.); power loading, 9·5 kg./h.p. (21 lbs./h.p.). Wing-power, 4·1 h.p./sq.m. (0·38 h.p./sq.ft.) Top speed, 140 km./h. (87 m.p.h.). Climb to 1,000 m. (3,300 ft. in 12 minutes.

"Loading-figure" (metric), 59·9; (British), 59·4).

The "loading-figure" is the power loading multiplied by the square root of the wing loading.

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"AIRSHIPS"

The monthly house dinner at the Royal Aero Club was held on December 15, with the Right Hon. Lord Thomson of Cardington in the chair. The subject for discussion was "Airships," but the speeches dealt mostly with the Airship Club, which is a subject which does not call for much in the way of debating powers.

After the loyal toast had been honoured, the Chairman rose and said that future generations would look upon R.33 much as the present age regarded H.M.S. *Victory*. As for R.101, he prophesied that before long it would be regarded as a pale phantom of the mighty airships which would follow it. We could not get away from the fact that we lived on an island, and we must devote our attention to long-distance flights. He then called upon Mr. Griffith Brewer, chairman of the Airship Club, to open the discussion.

Mr. Griffith Brewer said that he was the oldest member of the youngest club in the world, the Airship Club. His friend, Capt. Boothby, whom he congratulated on his promotion, had asked him to be chairman of that club for a Gilbertian reason. Sir Joseph Porter became the ruler of the Queen's Navee because he had never been sick at sea, and he (the speaker) had never been up in an airship. He spoke with gentle satire of the "activities" of the Airship Club. Financially they could not get on very fast, but they owned one balloon and hoped to obtain two more. The one which they possessed held 80,000 cub. ft. of hydrogen. It had competed in the Gordon Bennett race, and, though it had not won the cup, still the crew had given a fine exhibition of British resource and determination. As for airships, he had seen rigids in the distance. He had also seen small airships from afar. In the war, small airships had proved a necessity for convoying surface merchantmen, and one of them had spent 55 hours in the air on one flight while escorting the *Aquitania*. It had a crew of two men. He doubted if airships would be such good fun as free balloons. They had read great news in the papers that morning about the large airships.

Col. Moore Brabazon said that he did not know anything about airships. Once he had embarked on a civil airship and had walked the plank at a considerable height in a strong wind, which he thought was a terrifying experience; but he understood that for the new airships there would be a lift up the mast and a covered gangway. It was rather strange to see a new club formed for free ballooning, for the Royal Aero Club itself had been formed originally for that purpose. He believed that the history of flying would be much like the history of motoring. Each had started as a sport, and he recalled some of the early ways of motors. Aeroplanes also started as a sport. With aeroplanes the difficulty was night flying. And then there was the discomfort. They were a perfect hell—the discomfort was quite abominable. They must be made comfortable. He liked the lay-out for the saloon of R.101, with its foyer, palm trees, a bar (laughter)—he had not seen where the billiard table was, but he felt sure there was one. He concluded a breezy speech—"Here's to Airships!"

Admiral Murray Sueter was glad to see two veterans of airships present, Mr. Oswald Short and Capt. Boothby. He spoke of the "Mayfly," which did not fly. But it was a great success. It was moored at a mast for four or five days in a gale. When they broke her in moving her into the shed, an Admiral who knew nothing of airships was sent down to hold an inquiry. He looked at the airship and said: "The work of lunatics!" Well, thanks to the work of lunatics, the Germans patrolled the North Sea with Zeppelins during the war, and it was thanks to one of them that H.M.S. *Cressy* and her two consorts were torpedoed. At Jutland we should have gained a great victory had not the airships all been on the side of the Germans. We were always too late. Afterwards the R.34 flew the Atlantic twice. Little airships made good escorts. He congratulated Lord Thomson on the decision he took when he was Air Minister to go on with airships. Had that been taken before, we should have done more in the war.

Major G. H. Scott remarked that a rigid had been described as "a bunch of balloons in a birdcage." All big developments had been started by so-called lunatics. He approved of the Airship Club taking to free ballooning, as the balloon was the egg from which the airship was born. The Royal Aero Club had started as a balloon club, but something went wrong and it took to turning out aeroplane pilots. Now the Airship Club in due course would turn out airship pilots.

Capt. Boothby put in a plea for the airship of small or medium size. He believed that the big airship was now past its troubles. If they used helium, as they could do from the Canadian supplies, it would be the most formidable of all aircraft in war. He believed that airships of medium size, round about 30 tons (R.101 is to be 155 tons.—*Ed.*), could do useful work on routes of moderate distance round the shores of India, Australia and other Dominions. He thought the medium airship ought to share feeder line work with aeroplanes, but that was not the policy of the Air Ministry. He believed that aeroplanes were not reliable even with three engines. A little bird had told him that if one engine stopped, the other two took on a nice cheerful colour, and the pilot landed. He held that the Air Ministry should pay a subsidy for *aircraft*, and leave it to the operating firm to select the type.

Wing-Commander T. R. Cave-Browne-Cave said that the large airship was by far the most important development at the present time. Nevertheless, he was a great believer in the small type. To travellers he would say, "Go by airship and be comfortable!"

Flight-Lieutenant Booth was glad that the Airship Club was going in for free ballons. It was a most pleasant form of travel, free from noise, smell, and air sickness.

Flight-Lieutenant Elmhirst said that he was not a

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From a "Flight" Photograph.

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This new air-line is the first to be organised by civilian enterprise in the Empire overseas. Following the precedent so well established, Wakefield CASTROL is the lubricant used.

Aeroplane Lands on Helvellyn.

On December 22nd, Messrs. B. Hinckler and J. F. Leeming landed on Helvellyn, using an Avro, the engine being lubricated with Wakefield CASTROL.

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member of the Airship Club, but he meant to become one. Ballooning was a most delightful sport, and from it people would get on to airships.

Col. V. C. Richmond recalled that once it had been said that sea ships of iron were contrary to nature. In the same way some people thought it mad to try to send 80 tons of metal up into the air. Speaking as an engineer, he was convinced that they could make the airship a sufficiently strong and useful vehicle. He felt it in his bones. The mooring mast was the key to the operation of airships. The strains at the mast were the governing principle up to three-quarters of the length of the ship. It was a new problem. They had had to experiment with ships not designed for mooring. They were using steel to save weight; that was not generally recognised. In a big job it was stronger, weight for weight, than duralumin. In a large ship they could make a joint which was not a thing like a mouse-trap suffering from appendicitis. He was a great believer in small airships. They would have a future when funds and facilities were available. At present there were none; and what would steamships do if they had to provide all their own ports? Later on, the small ships would be able to use the stations prepared for the large airships.

Major C. C. Turner disclosed the fact that the balloon possessed by the Airship Club had been the free gift of Mr. Griffith Brewer. He had done a lot of ballooning in 1907 with the late Air Commodore Maitland, and it was his ambition to introduce his friends to its joys. He told how in 1909 the German public subscribed £300,000 to help Count Zeppelin in his programme. Speaking as a newspaper man he almost despaired of the possibility of awakening a like enthusiasm over here; but it might come when the two big airships got going.

Maj. F. A. de V. Robertson said that when airships were discussed one often heard a good deal of prejudice expressed against them. No such thing had been heard that evening. He was not an airship man, and had never been up in one. In the R.A.F. he had dealt with aeroplanes, and for the last ten years had been trying to persuade people that they were safe and comfortable. He could not be accused of prejudice against the aeroplane, and so he would say that if and when the two big airships proved a success they would give a fillip to the aeroplane movement such as it had never had before. The commerce of Calcutta and all India was based on a weekly mail about 17 days old. When airships brought letters in four days, perhaps twice a week, it would revolutionize Indian commerce. It would be impossible to take 36 hours, as now, in getting the mails across India by train. They would have to be carried through the night by aeroplanes. The same thing would happen in Australia, and there would be aeroplane feeder lines along the route.

Mr. Oswald Short paid a tribute to Admiral Murray Sueter. Once he had proposed to the Admiralty to build an airship of 2,000,000 cub. ft., and it had been turned down on account of the size. Admiral Sueter was not in charge then. He believed in small airships, and recommended aircraft designers to study airship possibilities.

Mr. G. C. Colebrook said that the public remembered accidents but forgot good work. If the future of the big airship were a gamble (which he did not believe), it was one which the Empire must take. The future of the Empire lay in communications, and he instanced the changed attitude of General Hertzog towards the Empire after the Imperial Conference, as a proof of the value of frequent personal contact.

The chairman then said that he had been specially requested to call on two "anti-airship" speakers, and he called on Mr. C. G. Grey and Col. Robert Lorraine.

Mr. C. G. Grey said that he was not anti-airship, though he should hate to go up in a machine filled with inflammable gas. There was no chance of using helium, and, after the coal strike, even coal gas was too dear. Airships might be useful as aeroplane carriers, but he was doubtful about their use for patrols. He had once had a friend in the Navy who commanded a submarine. He once pointed his gun at a Zeppelin, and the airship sheered off. Airships might do for high officials who liked to travel in comfort—if the airships were adequately protected by aeroplanes. As for free ballooning, it reminded him of the Chinaman's description of tobogganing, "Go like hell, and walk back three miles."

Col. Lorraine also denied that he was anti-airship. On the contrary, he was quite for them. He had been up with Mr. Willows, and had enjoyed it very much, and he was quite in favour of the Airship Club.

Winding up the debate, Lord Thomson said that his impressions of it were various. He himself was a large airship man, thanks to the arguments of Col. Richmond. After he had left the Air Ministry he went to the United States and visited Lakehurst. He made friends with the late captain of the "Shenandoah," who had professed himself a "hydrogen man." He was in such a funk of wasting the precious helium that it quite cramped his style as an airship captain. As Maj. Robertson had shown, there was no competition between airship and aeroplane; it was the airship for over water, and the aeroplane for over land. He could believe that in a free balloon one could consider calmly the affairs of the world below, while reconciling oneself to the prospect of returning home by some other means of locomotion. He wished all success to the Airship Club.

Col. Moore Brabazon proposed a vote of thanks to the chairman in very warm terms, paying a tribute to the decision he took when in office, when it must have been difficult to do the big thing. Lord Thomson briefly returned thanks.

THE ROYAL AIR FORCE

London Gazette, December 21, 1926.

General Duties Branch

The following Pilot Officers on probation are confirmed in rank (Dec. 2):—E. G. Searson, H. J. Walker. The following are transferred to the Reserve:—

Class A.—Flight-Lieutenants: G. Birkett; Dec. 5. D. Craik, D.F.C. Dec. 19. F. J. Watts; Dee. 19. Flying Officer C. C. K. Dagg, A.F.C.; Dec. 23.

Class B.—Flying Officer R. J. Copley; Dec. 19.

Class C.—Flying Officer F. R. Eason; Dec. 23.

The following resign their short service commns.:—Flight-Lieut. A. A. Ward (Lieut., R.A.R.O., R.A.); Dec. 10. Flying Officer D. C. H. Ferguson; Dec. 11. F. H. Kennedy, Lieut. R.N., Flying Officer R.A.F., relinquishes his temp. commn. on return to naval duty; Oct. 31. Flying Officer A. Leslie-Moore relinquishes his short service commn. on account of ill-health and iz permitted to retain his rank; Oct. 30. Pilot Officer G. F. G. Cox is dismissed the service by sentence of General Court-martial; Dec. 3.

Stores Branch

Flying Officer H. J. Hunter is granted a permanent commn. in this rank, with effect from Nov. 24, 1925, on completion of probationary service. Flying Officer on probation H. Seidenberg is confirmed in rank; Oct. 6. Pilot Officer J. E. Welman takes rank and precedence as if his appointment as a Pilot Officer bore date Aug. 10. Reduction takes effect from Nov. 25.

Memorandum

Lieut. L. W. B. Parsons relinquishes his temp. commn. on re-enlistment in the Territorial Army; May 17, 1920.

Reserve of Air Force Officers

General Duties Branch

H. N. Miller is granted a commn. in Class B as a Pilot Officer on probation; Dec. 21. H. P. Wilson is granted a commn. in the Special Reserve as Pilot Officer on probation; Dec. 21. The following Flying Officers relinquish their commns. on completion of service:—A. L. Jones; Oct. 24. H. E. Winch; Oct. 24. G. S. Fiske; Nov. 27. W. J. Burr, M.C., D.C.M., M.M.; Dec. 17. S. P. B. De M. Bucknall; Dec. 19.

Princess Mary's R.A.F. Nursing Service

Matron Miss Grace Nicholson, A.R.R.C., is placed on the retired list on account of ill-health; Dec. 22.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander W. S. Douglas, M.C., D.F.C., to R.A.F. Depot, Uxbridge, for course at Imperial Defence College, 1.1.27.

Squadron Leaders: A. H. Peck, D.S.O., M.C, to H.Q., Iraq, 7.12.26. L. L. MacLean to Aircraft Park, India, 7.12.26. D. F. Stevenson, D.S.O., M.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estabt., 25.11.26.

Flight Lieutenants: J. V. Read, M.B.E., to No. 4 Flying Training Sch., Egypt, 7.12.26. I. M. Rodney to Aircraft Depot, India, 7.12.26. H. A. Smith, M.C., to No. 55 Sqdn., Iraq, 7.12.26. E. F. Turner and W. E. Knowlden, to H.Q., 7.12.26. L. M. Elworthy, to No. 84 Sqdn., Iraq, 7.12.26. H. J. Collins to No. 30 Sqdn., Iraq, 7.12.26. L. C. Wynne-Tyson, to Station Commandant, Basrah, 7.12.26. G. F. Moody to No. 6 Armoured Car Coy., Iraq., 7.12.26. M. A. Simpson, to R.A.F. Depot, Uxbridge, 1.12.26. M. H. Coote, to No. 29 Sqdn., Duxford, 1.1.27. L. Darvall, to Central Flying School, Wittering, 31.12.26. W. E. G. Bryant, M.B.E., to School of Army Co-operation, Old Sarum, 20.12.26. F. G. Brockman, to H.Q., Fighting Area, Uxbridge, 7.12.26. V. Buxton, O.B.E., to No. 14 Sqdn., Palestine, 18.12.26.

NAVAL APPOINTMENTS

The following appointments were made by the Admiralty on December 23,

Lieuts.—E. C. G. Ermen, C. A. N. Hooper, R. F. Jessel, D. M. L. Neame. A. O. Watson, H. D. Smallwood, H. S. Cooper, T. S. Jackson, and C. Campbell, attached to R.A.F. for period "A" (Jan. 4), to join No. 1 Flying Training School, Neverhaven, p.m. (Jan. 3).

Lieuts. (*Flying Officers, R.A.F.*).—J. H. I. Wood, to *Furious*, and for full flying duties in 443 Flight; N. R. Courthorpe Munroe, to *Victory*, and for full flying duties in 442 Flight; and E. J. E. Burt, to *Furious*, and for final deck landing training in 421 Flight (Dec. 21).

R.A.F. ELECTRICAL AND WIRELESS SCHOOL, FLOWERDOWN

Passing-Out Inspection of Apprentices

THE fifth Passing-Out Inspection of Aircraft Apprentices, who have been trained at the R.A.F. Electrical and Wireless School at Flowerdown, took place on December 17, when Air Vice-Marshal Sir John Steel, K.B.E., C.B., C.M.G., A.O.C., Wessex Bombing Area, inspected the apprentices and presented the awards, etc.

Group-Capt. R. P. Ross, D.S.O., A.F.C., Commandant of the School at Flowerdown, says in his report that altogether there are 248 Aircraft Apprentices under training, exclusive of the Passing-Out Entry of 36. Of the 248, 196 are being trained as wireless operator mechanics, 10 as instrument makers, and 42 as electricians. The standard of discipline and drill maintained by the present Passing-Out Entry has been excellent, and the educational standard attained has been very good indeed, especially in the technical sections and workshops; the whole of the syllabus has been covered.

The voluntary evening classes have been very well attended, and every aircraft apprentice has successfully operated wireless instruments in the air. The athletic qualifications of this entry have equalled, and in some cases have surpassed, the fine example set by the previous term. Keenness has been shown in the gymnasium and miniature rifle range, and there is promise of several gymnasts and marksmen of merit. The health of the aircraft apprentices has been very good on the whole.

Of the present entry, 10 have passed out as Leading Aircraftsmen; 20 as Aircraftsmen, First Class; and 6 as Aircraftsmen, Second Class. There have been no failures.

A cadetship has been offered to No. 364737 A/A T. Shelley, who is also the winner of the Hyde-Thomson Memorial Prize, kindly awarded by R. D. Hyde-Thomson, Esq.

The following are retained for the Advanced Course, with a view to passing out as Corporals:—

No. 364944 A/A A. F. Monks.
No. 364749 A/A S. V. Vaizey.
No. 365006 A/A F. J. Spedding.
No. 364760 A/A E. H. Webb.

No. 365006 A/A F. J. Spedding wins the prize offered by the Air Ministry for the aircraft apprentice who obtains the highest aggregate marks in all sections.

No. 364944 A/A A. F. Monks wins the prize offered by the Air Ministry for the aircraft apprentice who obtains the highest marks in technical subjects.

No. 364539 A/A W. Bourne wins the prize offered by the Air Ministry for the aircraft apprentice who obtains the highest marks in educational subjects.

* * * *

PERSONALS

Married

At St. Mary's, Headley, Surrey, the marriage took place on December 15 of Flight-Lieut. JAMES ALEXANDER GORDON HASLAM, M.C., D.F.C., R.A.F., younger son of the late Mr. and Mrs. John Bailey Haslam, of Rugby, with HELEN KINNEAR, eldest daughter of the late Mr. H. M. CUTHBERT, of Cape Town, South Africa, and of Lady Seymour-Lloyd, and step-daughter of Sir John Seymour-Lloyd, K.C., of Headley Grove, Headley. Squadron-Leader T. E. B. Howe, R.A.F., was best man.

ALEC RYDE, R.A.F., was married on November 5, to JOYCE, only daughter of Capt. BARWICK, R.I.M. (retired).

To be Married.

The engagement is announced between Flight-Lieut. T. O. CLOGSTOUN, R.A.F., younger son of H. C. Clogstoun, C.I.E., O.B.E., and the late Mrs. Clogstoun, and KATHARIN, youngest daughter of the late Mr. and Mrs. W. J. N. LIDDALL, of Edinburgh.

Death.

LIEUT. MAURICE ANTHONY MAUDE, H.M.S. *Vindictive*, whose death from a shooting accident occurred at Kowloon, China, was born on June 15, 1900, and passed into the Royal Naval College, Osborne. After training for the Fleet Air Arm, he was appointed to the *Vindictive*, and served in the Aircraft Carrier *Hermes* at Malta, going from there to Hong Kong. When the *Hermes* was recalled to Malta, Lieutenant Maude was appointed to the command of a "Detached Flight" consisting of six seaplanes, at Hong Kong, in which capacity he was serving at the time of his death.

PUBLICATIONS RECEIVED

Australia and Back. By Sir Alan Cobham, K.B.E. A. and C. Black, Ltd., Soho Square, London, W. Price 2*s*. 6*d*. net.

The Air Pilot Monthly Supplement, No. 26. *December.* 1926. Air Ministry, Kingsway, London, W.C. 2.

Le Document Aeronautique de la Republique Tchecoslovaque. Ministere Tchecoslovaque des Travaux Publics, Prague.

Motorists and Motor Mechanic's Diary, 1927. Sir Herbert Austin, Longbridge Works, Birmingham.

Aeronautical Research Committee Reports and Memoranda: No. 1031 (*M*.42).—The Torsion of Circular and Elliptical Cylinders of Homogeneous Aeolotropic Materials. By S. J. Wright, B.A. May, 1926. Price 4d. net. No. 1035 (M. 44). Report on the Burning of Aluminium. By J. D. Grogan, B.A., February, 1926. Price 1*s*. net. H.M. Stationery Office, Kingsway, London, W.C. 2.

"*Southwark Cathedral.*" Christmas and New Year Greetings from Sir Charles and Lady Wakefield.

Burma Forest Bulletin No. 13. *Report on Aerial Reconnaissance, Stock-mapping, and Photography of the Forests of the Tavoy and Mergui Districts. January to April,* 1925. By C. W. Scott and C. R. Robbins. Published by The Superintendent, Government Printing Office, Rangoon, Burma. Price 3*s*. The Air Survey Co., Ltd., 3, Copthall-buildings, Copthall-avenue, London, E.C.2.

Aeronautical Research Committee Reports and Memoranda: *No.* 1023 (*M*. 39).—Some further Experiments on the Behaviour of Single Crystals of Aluminium Under Reversed Torsional Stresses. By H. J. Gough, S. J. Wright, and D. Hanson. January, 1926. Price 1*s*. 3*d*. net. *No.* 1033 (*Ae*. 226).—On the Advantages of an Open Jet Type of Wind Tunnel for Airscrew Tests. By H. Glauert and C. N. H. Lock. May, 1926. Price 9*d*. net. H.M. Stationery Office, Kingsway, London, W.C.2.

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"*The Blackburn Iris.*" *Illustrated Calendar,* 1927. The Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds.

Catalogues

Armstrong Siddeley Aero Motors. Armstrong Siddeley Motors, Ltd., 10, Old Bond Street, London, W., and Coventry.

"*Aviation*": *Zenith Carburettor.* Société du Carburateur Zénith. 49–51, Chemin Feuillat, Lyon, France.

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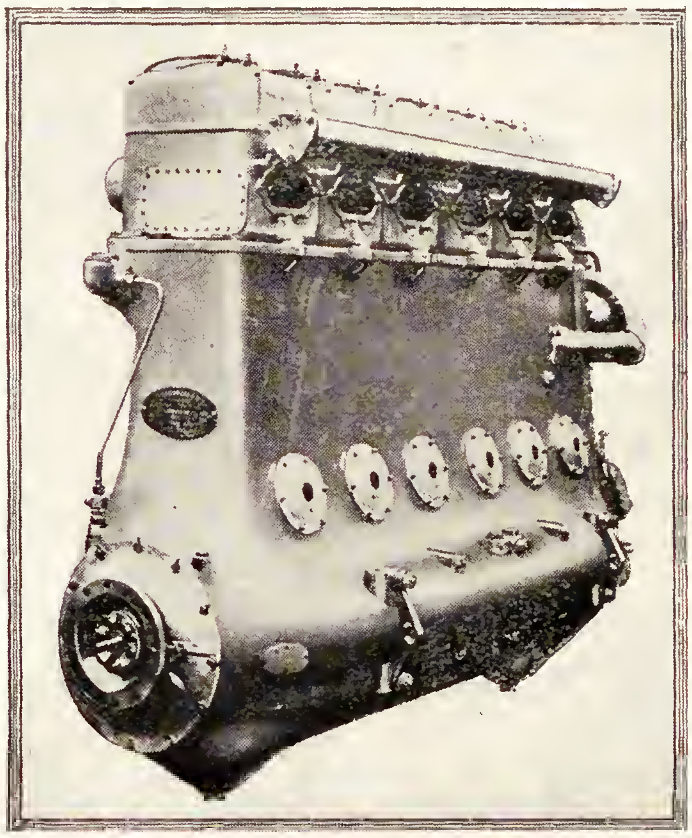

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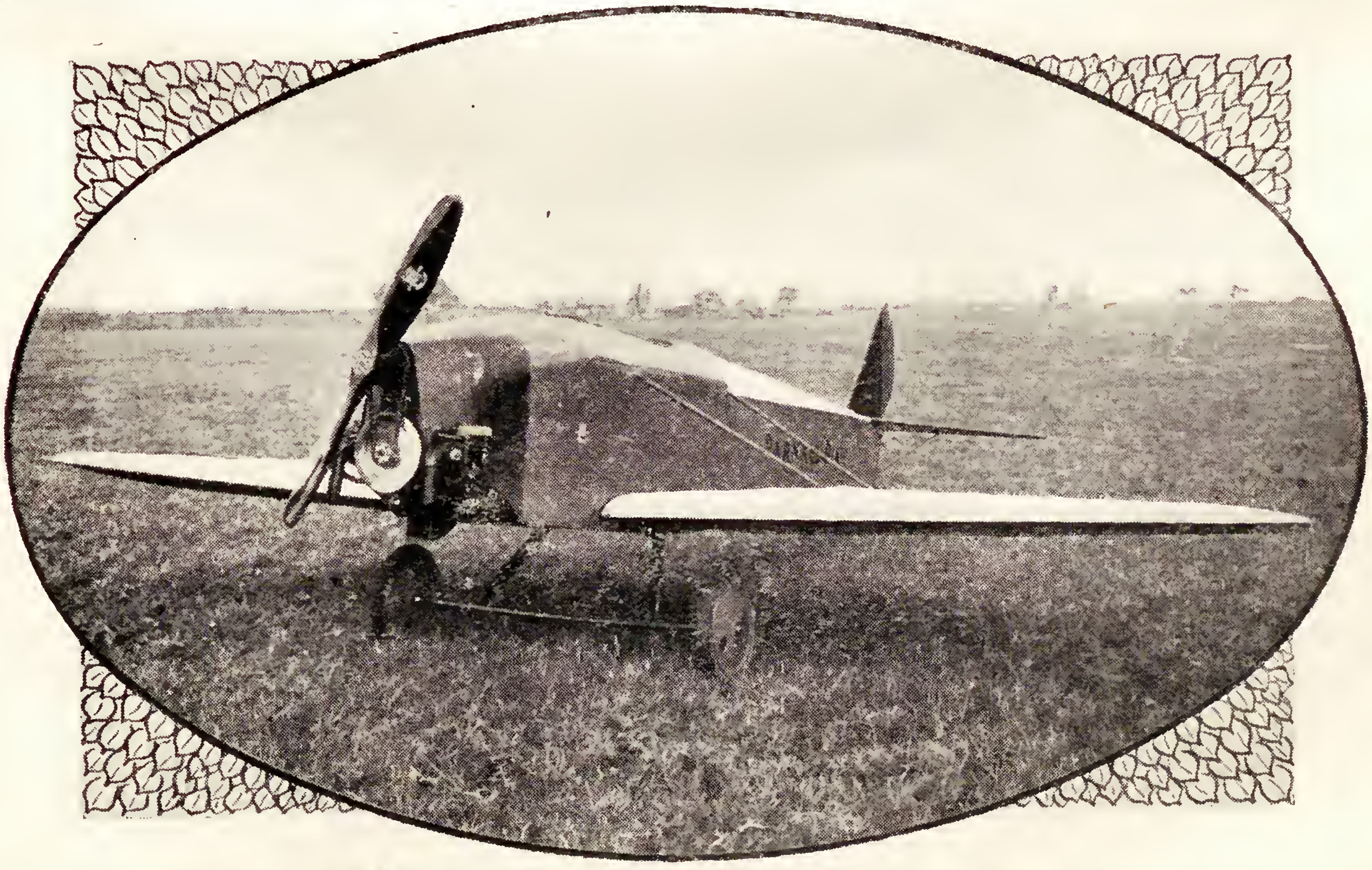

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